



**Model MT5634MU**  
**Portable USB Modem**

**User Guide**



## User Guide

S0000001 Revision F

MultiMobileUSB (Model MT5634MU)

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### Record of Revisions

Revision	Date	Description
<b>A</b>	(4/30/99)	Manual released.
<b>B</b>	(3/3/00)	Added installation procedure for Windows 2000; %A1, &C2, &En Result codes and S-18 S-Register.
<b>C</b>	(5/13/01)	Added info on Windows ME, Flash Wizard, & Global Wizard.
<b>D</b>	(4/02/03)	Added info on PhoneTools. Added installation of Windows XP drivers. Removed the chapter about remote configuration. Removed list of related manuals which included old voice command document.
<b>E</b>	04/06/04	Added installation for Multi-Tech Systems Modem Scripts for Mac OS.
<b>F</b>	05/03/07	Revised tech support listing and warranty.

### Patents

This Product is covered by one or more of the following U.S. Patent Numbers: **5.301.274; 5.309.562; 5.355.365; 5.355.653; 5.452.289; 5.453.986.** Other Patents Pending.

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### Notice

Though these modems are capable of 56 Kbps download performance, line impairments, public telephone infrastructure and other external technological factors currently prevent maximum 56 Kbps connections.

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## Chapter 1 - Introduction and Description

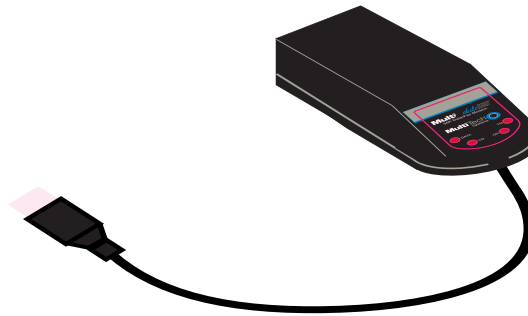


## Introduction

Welcome to the world of data communications. You have acquired one of the finest intelligent data and fax modems available today from one of America's oldest and most respected modem manufacturers: Multi-Tech Systems, Inc. This user's guide will help you install, configure, test and use your modem.

## Product Description

The MT5634MU modem incorporates V.90™ technology, which enables Internet connections at data rates up to 56 Kbps\* over standard telephone lines. V.90 technology is able to send data downstream from the Internet to your computer at these speeds because data on the telephone network typically is converted from digital to analog only once before it reaches your modem. Upstream transmissions, and transmissions between client modems, are limited to data rates of 33.6 Kbps, as are downstream transmissions that are converted more than once on the telephone network.



**Figure 1-1: MT5634MU**

The MT5634MU is Plug-and-Play in Windows 2000, Windows ME, Windows 98, and Windows 95 operating systems with interactive automatic dialing and command mode configuration. In standard mode, you can store up to two command lines or telephone numbers of up to 40 characters each in the modems' nonvolatile memory. The modem pulse- or tone-dials, and recognizes dial tones and busy signals for reliable call-progress detection. The modem can detect AT&T calling card tones. It also has Caller ID, remote configuration and incorporates self-resetting lightning protection. The MT5634MU is FCC-registered for connection without notification to the telephone company.

The MT5634MU is a full-duplex intelligent modem with V.42 error correction, V.42bis data compression, and V.17 (14,400 bps), Class 1 and 2, Group 3 fax capabilities.

The MT5634MU operates with Multi-Tech's Global Wizard program. Telephone company technical requirements differ from country to country. In the Global Wizard program, you simply specify the country in which you will operate, selecting from a pull-down menu. Global Wizard does the rest, automatically setting up the correct operating parameters for your modem to operate in your country.

Multi-Tech's Flash Wizard utility allows MT5634MU firmware to be updated by the user.

## Universal Serial Bus (USB)

Universal Serial Bus (USB), defined by a consortium of industry leaders, permits connection of multiple low-speed and medium speed computer peripheral devices such as telephones, modems, printers, keyboards, mice, and scanners; all from a single personal computer port. The specification, based on an open architecture is quickly becoming a standard feature in new desktop and notebook computers.

*\* Although K56flex™ technology is capable of downloads of up to 56 Kbps, FCC regulations currently restrict ISP modems to downloads of 53 Kbps.*

## What Can You Do with Your Modem?

Your Multi-Tech MultiMobile MT5634MU is the gateway to the exciting world of telecommunications.

You can use it to access commercial on-line information services such as America Online, Genie, and Prodigy. These services provide access to databases, encyclopedias, stock reports, news, weather, and shopping. They provide electronic mail (e-mail) links to subscribers of the same and other services. Public message areas called forums allow subscribers to trade information and opinions on a vast array of topics from A to Z, while vendor forums provide hardware and software support from Multi-Tech and other manufacturers. Online services also allow you to upload and download computer programs, data files, and updated software such as video and printer drivers.

Your modem can also connect you to the Internet, an international computer network of universities, libraries, businesses, and government agencies. Like the commercial online services, the Internet provides e-mail services, public message areas, and access to information and software, much of it easily accessed through the World Wide Web.

Other uses include direct links to colleagues with modems, to banks, and to service bureaus. You can also telecommute with your fax modem—work at home while communicating with the office by modem or fax.

And of course, you can use your modem to exchange faxes with any fax machine in the world, enabling you to communicate quickly with businesses and organizations that do not have direct modem communications.

## Features

- Compliance with major ITU-T, TIA, and EIA international standards to ensure compatibility with other modems.
- Caller ID capability can identify a caller's phone number (available only on U.S. products).
- Limited warranty: Ten years

## Data

- Supports the V.90 standard for data transmission speeds up to 56 Kbps while maintaining compatibility with lower-speed modems.
- Supports the enhanced ITU-T V.34 standard, with data transmission speeds to 33.6 Kbps.
- Supports asynchronous data rates at 56K, 33.6K, 31.2K, 28.8K, 26.4K, 24K, 21.6K, 19.2K, 16.8K, 14.4K, 12K, 9600, 4800, 2400, 1200, and 300 bps.
- Supports automatic fallback to slower speeds in noisy line conditions, and fall-forward to faster speeds as conditions improve.
- ITU-T V.42 LAP-M and MNP Class 3 and 4 error correction.
- ITU-T V.42bis (4-to-1) and MNP 5 (2-to-1) data compression.
- Automatically disables data compression when transferring already-compressed files.
- Autodial, redial, pulse (rotary) and touch-tone dial.
- Dial tone and busy signal detection for reliable call-progress reporting.
- Compatible with the standard AT command set used by most communication programs.

## Fax

- Supports V.17, Group 3 fax communication standards, allowing it to communicate with other fax modems as well as with fax machines.
- Responds to EIA/TIA Class 1 and 2 fax commands, enabling it to exchange editable and encrypted faxes with Windows 95 computers.
- Sends and receives faxes from your computer at 14,400 bps, 9600 bps, 7200 bps, 4800 bps, 2400 bps, or 300 bps.

## Required Equipment

In addition to the contents of your modem package, you need the following equipment.

- **Computer:** Your modem can only be connected to a computer with a USB port.
- **Telephone Line:** You must have a telephone line with jack (connector) that accepts the cable that comes with the modem. If you do not have a telephone jack near your computer, you should install one before proceeding.

Do-it-yourself telephone extension kits and accessories are available wherever telephones are sold. You may also hire an independent contractor or your local telephone company to install an extension. If you want a separate line for your fax modem, you must contact your telephone company.

- **Communications Software:** To operate your modem, you must have data communications and fax communications software (included with the modem). Data communications software simplifies control of the modem by guiding you through the process of selecting your serial port, your port speed, and other variables, and then storing your settings, including frequently called phone numbers, so they can be recalled with the stroke of a key or the click of a mouse. Data communications software must be set up, or configured, before you can use it.



## Connections

To use your modem, you must connect the MT5634MU's USB cable connector to your computer ("USB") and to a telephone line ("LINE").

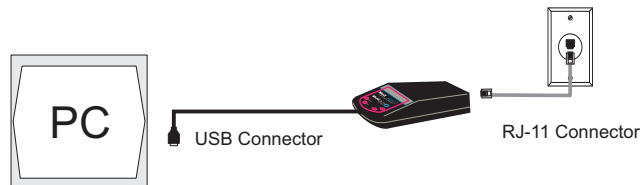


Figure 1-2: USB and communications connectors.

### Connecting to the Computer ("USB")

Connect the USB connector on the MT5634MU to a USB connector on the back of your computer.

### Connecting to the Telephone Line ("LINE")

Plug one end of the cable provided with the modem into the telephone jack in your home or office. Plug the other end into the LINE jack on the modem.

**Note:** The Federal Communications Commission (FCC), Industry Canada, and other regulatory agencies impose certain restrictions on equipment connected to public telephone systems. See [Appendix A](#) for more information.

### Surge Protectors and Lightning

Your modem has self-resetting lightning protection to protect it from electrical spikes on the telephone line. During an electrical storm, your safest course is to unplug your computer equipment from both the power outlet and the telephone line.

## Front Panel

The MT5634MU has 4 LEDs on the front panel indicating status, configuration, and activity:

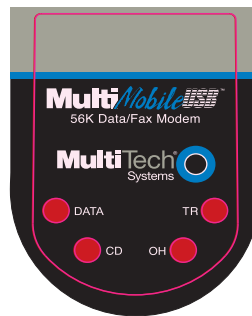


Figure 1-3: Front panel

- **Data.** The Data LED flashes when the modem is transmitting/receiving data to/from another modem.
- **Carrier Detect.** The CD LED lights when the modem detects a valid carrier signal from another modem. It is on when the modem is communicating with the other modem and off when the link is broken.
- **Off-Hook.** The OH LED lights when the modem is off-hook, which occurs when the modem is dialing, online, or answering a call. The LED flashes when the modem pulse-dials.
- **Terminal Ready.** The TR LED lights when Windows detects and initializes the modem.

# Technical Specifications

Your MultiMobileUSB fax modem meets the following specifications:

<b>Trade Name</b>	MultiMobileUSB™
<b>Model Number</b>	MT5634MU
<b>Client-to-Server Data Rates</b>	V.90 or K56flex speeds when accessing an ISP type V.90 or K56flex server (actual speed depends on server capabilities/line conditions) *
<b>Client-to-Client Data Rates</b>	33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
<b>Fax Data Rates</b>	14,400, 12,000, 9600, 7200, 4800, 2400, 300 bps
<b>Data Format</b>	Serial, binary, asynchronous
<b>Modem Compatibility</b>	ITU V.90, K56flex; ITU-T V.34 enhanced, V.34, V.32terbo, V.32bis, V.32, V.22bis, V.22; Bell 212A and 103/113; ITU-T V.29, V.42, V.42bis; ITU-T V.21 & V.23 in international versions
<b>Fax Compatibility</b>	ITU-T Group 3, Class 1 and 2, T.4, T.30, V.21, V.27ter, V.29, V.17, and TIA/EIA TR29.2
<b>Error Correction</b>	ITU-T V.42 (LAP-M or MNP 3–4)
<b>Data Compression</b>	ITU-T V.42bis (4:1 throughput), MNP 5 (2:1 throughput)
<b>Flow Control</b>	XON/XOFF (software), RTS/CTS (hardware)
<b>Intelligent Features</b>	Plug and play; fully AT command compatible; autodial, redial, repeat dial; pulse or tone dial; dial pauses; auto answer; caller ID; EIA extended automode; adaptive line probing; automatic symbol and carrier frequency during start-up, retrain, and rate renegotiation; call status display, auto-parity and data rate selections; keyboard-controlled modem options; non-volatile memory; on-screen displays for modem option parameters; command lines of up to 40 characters each; help menus; remote configuration;
<b>Command Buffer</b>	40 characters
<b>Data Modulation</b>	FSK at 300 bps, PSK at 1200 bps, QAM at 2400, 4800, and 9600 bps (non-trellis), QAM with trellis-coded modulation (TCM) at 9600, 12,000, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, 33,600, and 56,000 bps
<b>Fax Modulation</b>	V.21 CH2 FSK at 300 bps (half duplex) V.27ter DPSK at 4800 and 2400 bps V.29 QAM at 9600 and 7200 bps V.17TCM at 14400, 12000, 9600, and 7200 bps
<b>Carrier Frequencies ITU-T V.34</b>	1600, 1646, 1680, 1800, 1829, 1867, 1920, 1959, 2000 Hz
<b>Carrier Frequencies ITU-T V.32bis/V.32</b>	1800 Hz
<b>Carrier Frequencies V.22bis/V.22 or</b>	Transmit originate: 1200 Hz Transmit answer: 2400 Hz
<b>Bell 212A Standard (2400 &amp; 1200 bps)</b>	Receive originate: 2400 Hz Receive answer: 1200 Hz
<b>Carrier Frequencies ITU-T V.23 (1200 bps)</b>	Transmit originate: 390 Hz mark 450 Hz space Receive originate: 1300 Hz mark 2100 Hz space Transmit answer: 1300 Hz mark 2100 Hz space Receive answer: 390 Hz mark 450 Hz space

<b>Carrier Frequencies</b> <b>ITU-T V.21</b> <b>(0–300 bps)</b>	Transmit originate:	980 Hz mark 1180 Hz space
	Receive originate:	1650 Hz mark 1850 Hz space
	Transmit answer:	1650 Hz mark 1850 Hz space
	Receive answer:	980 Hz mark 1180 Hz space
<b>Carrier Frequencies</b> <b>Bell 103/113</b> <b>(0–300 bps)</b>	Transmit originate:	1270 Hz mark 1070 Hz space
	Receive originate:	2225 Hz mark 2025 Hz space
	Transmit answer:	2225 Hz mark 2025 Hz space
	Receive answer:	1270 Hz mark 1070 Hz space
<b>Fax Carrier</b> <b>Frequencies</b>	V.21 Ch2 (half duplex):	
	1650 Hz mark,	1850 HZ space for transmit originate
	1650 HZ mark,	1850 Hz space for transmit answer
	V.27ter:	1800 Hz originate/answer
	V.29 QAM:	1800 Hz originate/answer
	V.17 TCM:	1800 Hz originate/answer
<b>Transmit Level</b>	-11 dBm (dial-up)	
<b>Frequency Stability</b>	±0.01%	
<b>Receiver Sensitivity</b>	-43 dBm under worst-case conditions	
<b>AGC Dynamic Range</b>	43 dB	
<b>Connectors</b>	USB connector; one RJ-11 phone jack	
<b>Cables</b>	One RJ-11 phone cable	
	<b>Note:</b> Any cables connected to the computer should be shielded to reduce interference.	
<b>Diagnostics</b>	Power-on self test, local analog loop, local digital loop, remote digital loop.	
<b>Indicators</b>	LEDs for Data, Carrier Detect, Off Hook, Terminal Ready	
<b>Environmental</b>	Temperature range 0°–50°C (32°–120°F); humidity range 20–90% (non-condensing)	
<b>Dimensions</b>	3 cm wide x 8 cm long x 2.5 cm high (1.25" x 3.13" x 1.0")	
<b>Weight</b>	62 g (2.2 oz)	
<b>Limited Warranty</b>	10 years	



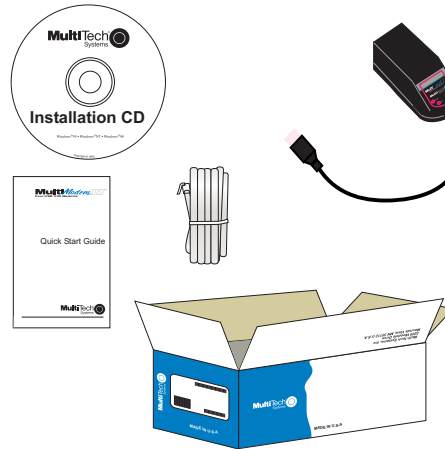


## Chapter 2 - Installation



## Unpacking

The shipping box contains the MT5634MU, one RJ-11 cable, your Quick Start Guide, and one Installation CD (which contains the MT5634MU driver software, Global Wizard, Flash Wizard, the PhoneTools software package and documentation materials, including this on-line MT5634MU User Guide). Inspect the contents for signs of any shipping damage. If damage is observed, do not power up the unit; contact Multi-Tech's Technical Support for advice (see Appendix D). If no damage is observed, perform the cabling procedure.



**Figure 2-1: Unpacking**

### You supply

- A computer with an unused USB port
- A nearby telephone line jack

## Safety Warning Telecom

1. Never install telephone wiring during a lightning storm.
2. Never install a telephone jack in wet locations unless the jack is specifically designed for wet locations.
3. This product is to be used with UL and cUL listed computers.
4. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
5. Use caution when installing or modifying telephone lines.
6. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
7. Do not use a telephone in the vicinity of a gas leak.
8. To reduce the risk of fire, use only 26 AWG or larger telecommunication line cord.

## Step 1: Connect the Modem to Your System

Connect the MT5634MU to your computer's USB port and connect the telephone line to your MT5634MU and a telephone wall jack.

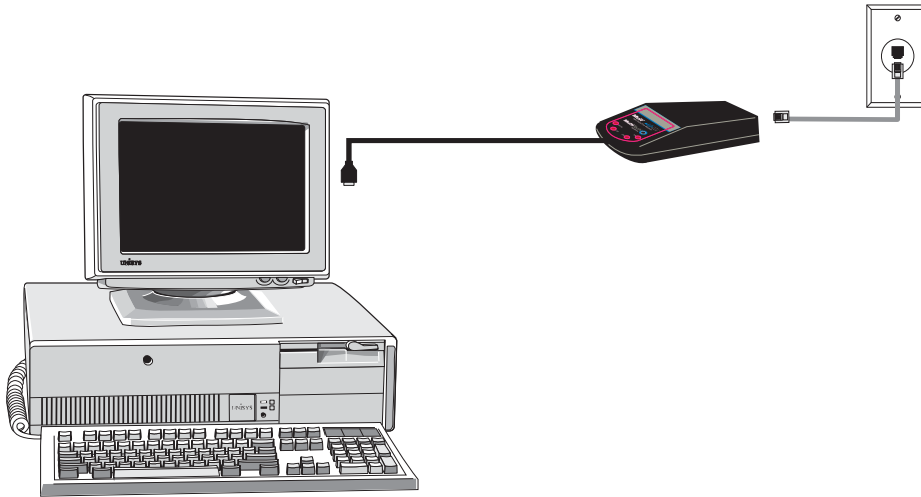


Figure 2-2: Modem connections

### USB Connection

Plug the USB cable connector on the modem into a USB port connector on your computer.

### Line Connection

Plug one end of the phone cable into the modem's LINE jack, and the other end into a phone line wall jack.

**Note:** The Federal Communications Commission (FCC), and Industry Canada impose certain restrictions on equipment connected to public telephone systems. See [Appendix A](#) for more information.

## Step 2: Installing the Modem

The MT5634MU is compatible with Windows XP/ 2000/ME/ 98 and some versions of Windows 95.

### Installation in Windows XP

1. Power up your Windows XP system.
2. If you have not already done so, make all the necessary connections, including connecting the modem to an available USB port.
3. Insert the MultiModem USB CD into your CD drive.
4. Windows will detect that the new modem is present and launch the **Update Device Driver Wizard** dialog box.
5. Choose **Install from a list or specific location (Advanced)**, and click **Next**.
6. Select **Don't Search. I will choose the driver to install**, and click **Next**.
7. Click the **Have disk** button. **Browse** to x:\Drivers\WinXP. Select the file there and click **OK**. (x denotes your CD drive letter).
8. When the pop-up window comes up explaining that the driver is not digitally signed, click **Continue anyway** to finish the installation.

**NOTE:** This Microsoft operating system searches for a digital signature when you install any new hardware. If a "Digital Signature Not Found" screen appears, simply click the YES button to continue installation. Although Multi-Tech submits all eligible products to Microsoft for certification, the turn-around time is subject to many factors. Not having a digital signature does not affect product performance in any way.

### Installation in Windows 2000

1. Power up your Windows 2000 system.
2. If you have not already done so, connect the MT5634MU to your computer's USB port and connect the telephone line to your MT5634MU and a telephone wall jack.
3. Windows will detect that the new modem is present and indicate that it's in the process of installing. Then the **Welcome** screen of the **Found New Hardware Wizard** appears. Click **Next**.



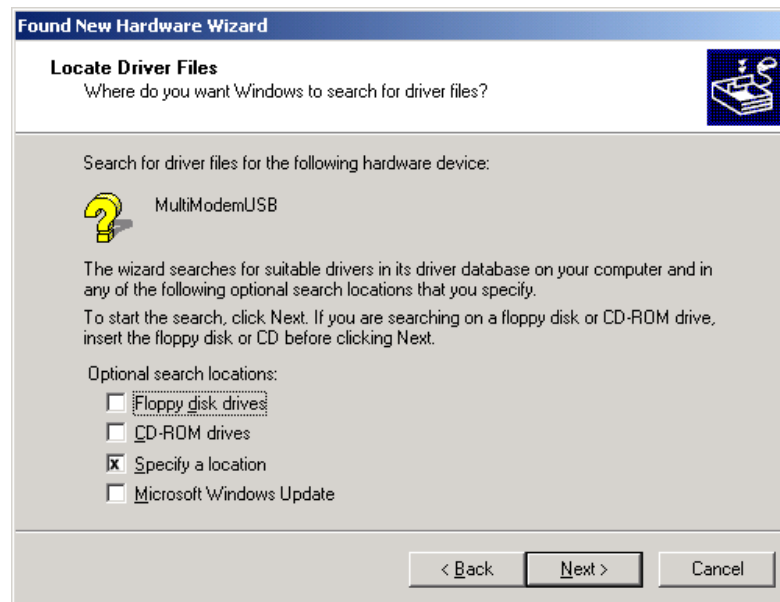


4. The **Install Hardware Device Drivers** screen appears indicating that it will install the hardware device drivers.



Verify that the "Search for a suitable driver for my device (recommended)" is selected and then click **Next**.

5. The **Locate Driver Files** screen appears asking where you want Windows to search for the driver files.

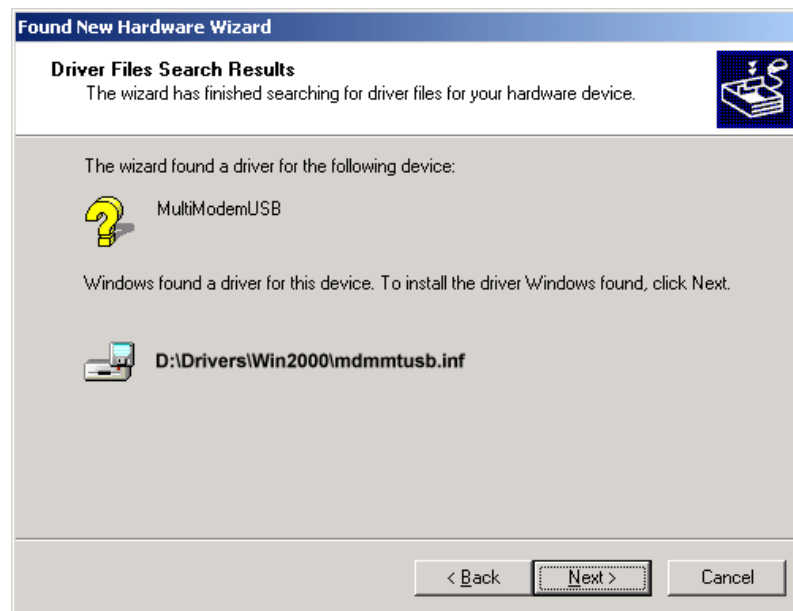


Verify that the "Specify a location" option is the *only* box selected, place the MT5634MU Installation CD into your CD drive, and click **Next**.

6. The next screen will say "Insert the manufacturer's installation disk into the drive selected and then click OK."

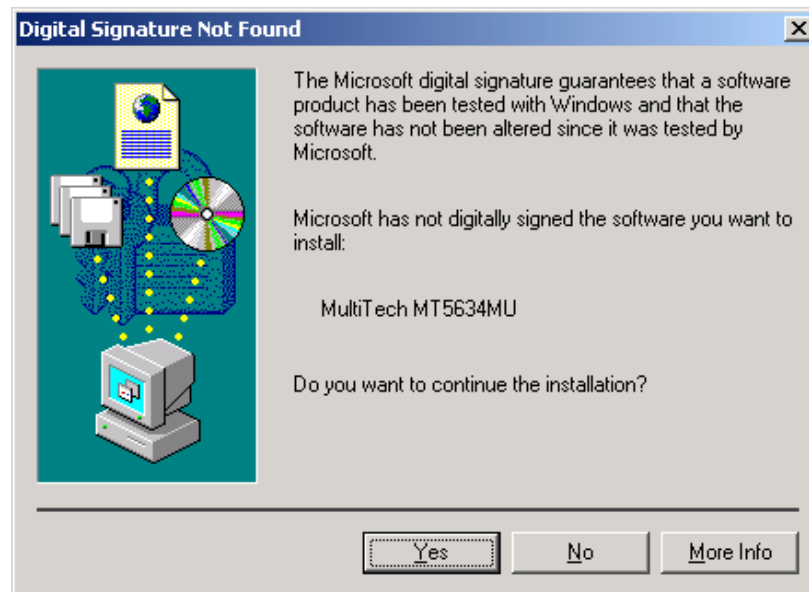
Click on the **Browse** button (when prompted to insert a disk into drive A:\, click **Cancel**). Navigate to your computer's CD-ROM drive. Select the folder DRIVERS\WIN 2000. Select the file MDMMTUSB.INF and click **Open**.

7. Then the **Driver Files Search Results** screen appears indicating that Windows has found the proper driver from the MT5634MU Installation CD.



Click **Next >** to install the selected driver.

8. The **Digital Signature Not Found** screen appears.



Click **Yes** to continue with the installation.

*NOTE: This Microsoft operating system searches for a digital signature when you install any new hardware. If a "Digital Signature Not Found" screen appears, simply click the YES button to continue installation. Although Multi-Tech submits all eligible products to Microsoft for certification, the turn-around time is subject to many factors. Not having a digital signature does not affect product performance in any way.*

9. A transient **Copying Files** screen appears briefly indicating that driver files are being copied to your computer's hard drive. Then a completion screen appears indicating that Windows has finished installing the driver.



Click **Finish** to complete the installation and exit the wizard.

After installation has been completed, you should test the operation of your new MT5634MU by registering it. Key in the URL given below and follow the on-line instructions:

<http://www.multitech.com/register>

## Installation in Windows ME

The MT5634MU driver files for Windows ME are installed in two groups, as described below. The installation wizard begins by installing certain driver files. At that point, Windows ME detects the modem as a new device. Then the installation wizard runs again to install the remaining driver files.

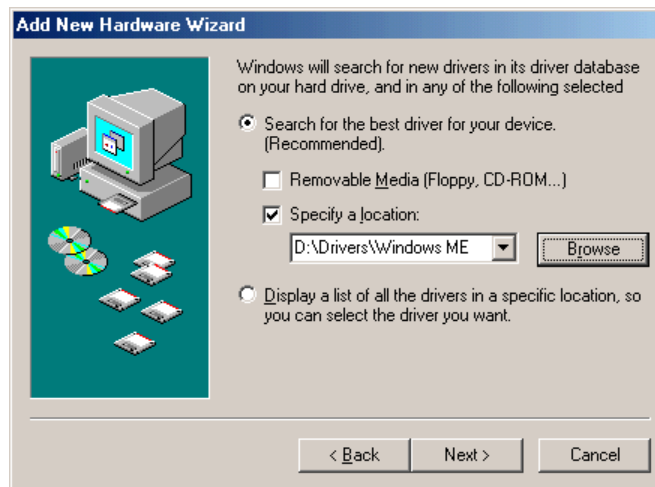
1. Power up your Windows ME computer.
2. Connect the MT5634MU to your computer's USB port. Then connect one end of the provided telephone line cord to your MT5634MU and the other end to a telephone wall jack.
3. Windows ME will detect that the new modem is present and launch the **Add New Hardware Wizard**.

Place the MT5634MU Installation CD into the CD drive of your PC. The first **Add New Hardware Wizard** screen will appear with the message "What would you like to do?"

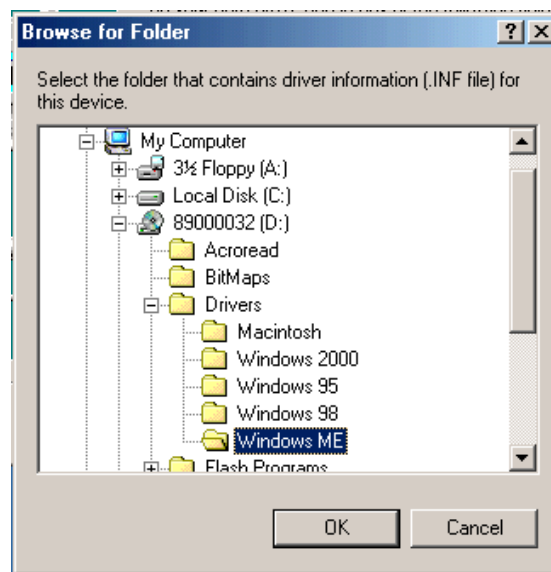


Choose "Specify the location of the driver (Advanced)" and click **Next**.

4. At the **Add New Hardware Wizard** “Windows will search for new drivers...” screen, uncheck the “Removable Media” button (if necessary) and check “Specify a location.”



5. Click the “Browse” button and navigate to the “Windows ME” subfolder of the “Drivers” folder on the MT5634MU Installation CD. Then click **OK**. Click **Cancel** if it prompts you for a floppy disk.



6. The **Add New Hardware Wizard** “Windows driver file search ...” screen appears.



Click **Next**.

7. Transient progress screens will appear while files are being copied. After the files have been copied to your PC, an **Add New Hardware Wizard** screen will appear indicating that Windows has finished installing this the first of two drivers.



Click **Finish** to complete the installation of this first driver. The wizard will close.

8. Windows ME will now detect an “Unknown Device” and begin another **Add New Hardware Wizard**, again asking “What would you like to do?”

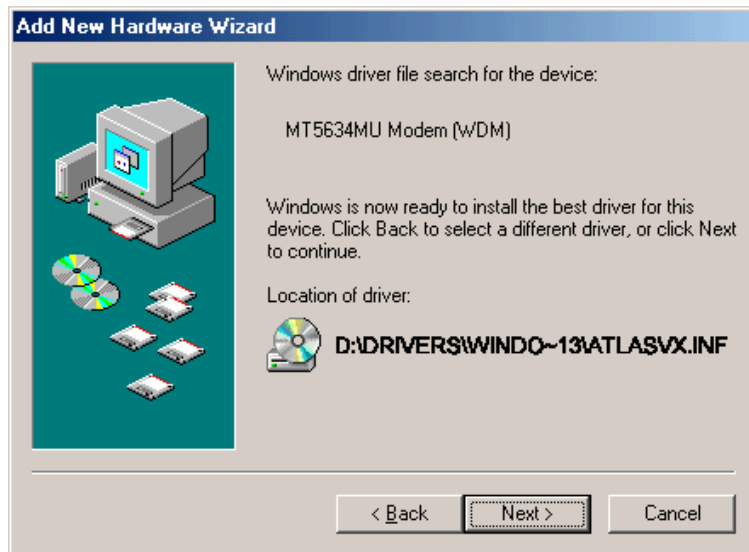


Choose “Specify the location of the driver (Advanced)” and click **Next**.

9. At the next screen, (the **Add New Hardware Wizard** “Windows will search for new drivers...” screen), uncheck the “Removable Media” button (if necessary) and check “Specify a location.” Click **Next**.



10. Transient screens will appear while files are being copied. The **Add New Hardware Wizard** “Windows driver file search” screen will appear. Click **Next**.



11. After files have been copied, a completion screen will appear.



- Click **Finish** to complete the installation of this the second driver. The wizard will close.
12. Remove the MT5634MU Installation CD from the computer's CD drive.
13. Test the operation of your modem by registering it online at <http://www.multitech.com/register>.



## Installation in Windows 98

1. Power up your Windows 98 system.
2. If you have not already done so, connect the MT5634MU to your computer's USB port and connect the telephone line to your MT5634MU and a telephone wall jack.
3. Windows will detect that the new modem is present and launch the **Add New Hardware Wizard** dialog box.



4. Place the MT5634MU CD into your CD drive and click **Next** to proceed with the installation.
5. The **Add New Hardware Wizard** dialog box is displayed with the message "What do you want Windows to do?" Verify that the "Search for the best driver for your device (Recommended)." option is selected and click **Next**.



6. The **Add New Hardware Wizard** dialog box is displayed with the message “Windows will search for a new driver . . .” Verify that the “CD-ROM drive” option is selected and click **Next**.



7. The **Add New Hardware Wizard** dialog box is displayed indicating that Windows has found an updated driver for this device, and also some other drivers that should work with this device. Verify that the “Updated driver (Recommended)” option is selected and click **Next**.



8. The **Add New Hardware Wizard** dialog box is displayed indicating that Windows will select the proper driver from the MT5634MU Installation CD and will display the information for verification.



Click **Next** to install the selected driver.

8. Once the files have been copied to your PC, the **Add New Hardware Wizard** dialog box is displayed indicating that Windows has finished installing the driver.



Click **Finish** to complete the installation and exit the wizard. The TR LED on your modem will light when the installation is complete. Remove the CD from the computer.

Once installation is complete, you should test the operation of your new MT5634MU by registering your MT5634MU product now. Key in the URL given below and follow the on-line instructions:

<http://www.multitech.com/register>

## Installation in Windows 95

Only Certain versions of Windows 95 offer support for USB peripherals. If you are unsure if your Win95 system supports USB, a free USB evaluation utility is available from the Shopping Bag page at <http://www.usb.org>. Just download the utility (287K) and run the .exe application. It will determine if you have USB support.

**Note 1:** If you are currently running Windows 95 on a PC with an OHCI USB controller, you will need to upgrade to Windows 98 to install your modem. If you have any questions, contact Multi-Tech Technical Support.

**Note 2:** Dialog boxes for the Windows 95 installation are not shown because they may vary depending on the version of Windows 95 being used.

If you would like to install your MT5634MU in Windows 95, perform the following steps.

1. Insert the MT5634MU Installation CD into your CD drive.
2. If you have not already done so, connect the MT5634MU to your computer's USB port and connect the telephone line to your MT5634MU and a telephone wall jack.
3. Windows will detect that the new modem is present and launch the **Update Device Driver Wizard** dialog box. Click **Next** to proceed with the installation.
4. The **Update Device Driver Wizard** dialog box is displayed indicating that Windows has searched for the driver on D:\ and, when identified, displays the driver name for verification. Verify that the correct name is displayed and click **Finish** to install the driver.
5. Windows prompts you to insert the CD. You have already inserted the CD, so click **OK** to continue.
6. The **Copy Files ...** dialog box is displayed. In the **Copy files from** field, choose **D:\** from the drop-down list and click **OK**.
7. When driver installation is finished, a completion message will appear, the TR LED on your modem will light, and the wizard will exit. At this time your installation is complete. Remove the CD from the computer.

Once installation is complete, you should test the operation of your new MT5634MU by registering your MT5634MU product now. Key in the URL given below and follow the on-line instructions:

<http://www.multitech.com/register>

## Removing Your Old Modem from Windows

When your new modem replaces another modem, the old modem installation remains in Windows even after you install the new modem. The old modem will still be selected in HyperTerminal and other Windows applications. Although you can change the application connection descriptions one at a time, it is easier to force Windows applications to use the new modem by removing the old modem from Windows.

### From Windows 2000

1. Click **Start | Settings | Control Panel**.
2. Double-click the Phone and Modems icon and click on the Modems tab.
3. In the list box, select the old modem.
4. Click **Remove**, then click **Close**.
5. The next time you dial a HyperTerminal connection, it will select your new modem and ask you to confirm the selection.

### From Windows ME

1. Go to Start | Settings | Control Panel
2. Double-click the Modems icon to open the **Modems Properties** screen.
3. In the **General** tab a list of modems appears. In this list, highlight the old modem.
4. Click **Remove**, and then click **Close**.
5. The next time you dial a HyperTerminal connection, it will select your new modem and ask you to confirm the selection.

### From Windows 98/95

1. Click **Start | Settings | Control Panel**.
2. Double-click the Modems icon to open the **Modems Properties** sheet.
3. In the list box, select the old modem.
4. Click **Remove**, then click **Close**.
5. The next time you dial a HyperTerminal connection, it will select your new modem and ask you to confirm the selection.

## Step 3: Configuring the Modem for Your Country

Different countries have different requirements for how modems must function. Therefore, before you use the modem, you must configure it to match the defaults of the country in which you are using it. You can configure the MT5634MU either manually using AT commands or with the Global Wizard. Both methods are described below.

### Using the Global Wizard Utility

The Global Wizard configuration utility is recommended for computers running Windows 95/98/ME/2000. The Global Wizard can configure your modem for a specific country with just a few mouse clicks.

1. Insert the MT5634MU Installation CD into the CD-ROM drive. The **Autorun** dialog box appears.
2. Click **Initial Setup and Country Selection**. The **Global Wizard** dialog box appears. Click **Next**.
3. View the Global Wizard as it searches for your modem and identifies it. Click **Next**.
4. Select the country in which the modem will be used, and then click **Next**.
5. Review your choice of country. If it is correct, click **Next** to configure the modem.
6. When Global Wizard announces that the parameters have been set, click **Finish** to exit.

### Using AT Commands

If you are comfortable using AT commands, you can configure your modem using AT commands. You must enter these commands in your communication program's terminal window.

To configure the modem for a specific country, execute the following AT commands:

1. Type `AT%T19,0,nn` (where *nn* represents the country code). Press **Enter**.
2. The modem will respond "OK."
3. Type `AT & F & W` (this saves changes). Press **Enter**.
4. The modem will respond "OK."

5. Type **ATI9** (this verifies that country code has been chosen). Press **Enter**.
6. The modem will display the country code in decimal format followed by an "OK."
7. Check to be sure the code for your country is displayed.  
If not, repeat procedure to correct.

Here are two examples of country, command, and result codes.

Country	AT Command (Hexidecimal)	ATI9 Result Code (Decimal)
Euro/NAM*	AT%T19,0,34 (default)	52
Japan	AT%T19,0,10	16

Because the list of country codes is continually being updated, we present the complete list on our Web site: <http://www.multitech.com/GlobalModem/config>

## Step 4: Installing Data Communications Software

Data communications software is designed to send and receive messages about the operation of your modem. Multi-Tech includes PhoneTools communications software with your modem. However, the modem will work with most data communications software packages. To install PhoneTools, insert the Installation CD into the CD-ROM drive; click on the PhoneTools icon. You will be asked to choose your language. The software will be loaded automatically onto your PC.



## Chapter 3 - AT Commands, S-Registers & Result Codes



## AT Commands

AT commands are used to control the operation of your modem. They are so called because each command must be preceded by the characters *AT* to get the *AT*tention of the modem.

AT commands can be issued only when the modem is in command mode or online command mode. The modem is in *command mode* whenever it is not connected to another modem. The modem is in *data mode* whenever it is connected to another modem and ready to exchange data. *Online command mode* is a temporary state in which you can issue commands to the modem while connected to another modem. To put the modem into online command mode from data mode, you must issue an *escape sequence* (+++) followed immediately by the *AT* characters and the command, e.g., +++**ATH** to hang up the modem. To return to data mode from online command mode, you must issue the command **ATO**.

To send AT commands to the modem you must use a communications program, such as the HyperTerminal applet in Windows 95 and NT 4.0, or the communications program included with your modem. You can issue commands to the modem either directly, by typing them in the terminal window of the communications program, or indirectly, by configuring the operating system or communications program to send the commands automatically. Fortunately, communications programs make daily operation of modems effortless by hiding the commands from the user. Most users, therefore, need to use AT commands only when reconfiguring the modem, e.g., to turn autoanswer on or off.

The format for entering an AT command is **ATXn**, where *X* is the command and *n* is the specific value for the command, sometimes called the command *parameter*. The value is always a number. If the value is zero, you can omit it from the command; thus, **AT&W** is equivalent to **AT&W0**. Most commands have a *default* value, which is the value that is set at the factory. The default values are shown in the “AT Command Summary,” which begins on the next page.

You must press ENTER to send the command to the modem. Any time the modem receives a command, it sends a response known as a *result code*. The most common result codes are *OK*, *ERROR*, and the *CONNECT* messages that the modem sends to the computer when it is connecting to another modem. For a table of valid result codes, see “Result Codes” at the end of this chapter.

You can issue several commands in one line, in what is called a command *string*. The command string begins with **AT** and ends when you press ENTER. Spaces to separate the commands are optional; they are ignored by the command interpreter. The most familiar command string is the *initialization string*, which is used to configure the modem when it is turned on or reset, or when your communications software calls another modem.



# AT Command Summary

Command: **AT**    **Attention Code**

Values: n/a

Description: The attention code precedes all command lines except **A/**, **A:**, and escape sequences.

Command: **ENTER**    **Key**

Values: n/a

Description: Press the ENTER (RETURN) key to execute most commands.

Command: **A**    **Answer**

Values: n/a

Description: Answer call before final ring.

Command: **A/**    **Repeat Last Command**

Values: n/a

Description: Repeat the last command string. Do not precede this command with **AT**. Do not press ENTER to execute.

Command: **Bn**    **Communication Standard Setting**

Values:  $n = 0-3, 15, 16$

Default: 1 and 16

Description: B0 Select ITU-T V.22 mode when modem is at 1200 bps.  
 B1 Select Bell 212A when modem is at 1200 bps.  
 B2 Deselect V.23 reverse channel (same as **B3**).  
 B3 Deselect V.23 reverse channel (same as **B2**).  
 B15 Select V.21 when the modem is at 300 bps.  
 B16 Select Bell 103J when the modem is at 300 bps.

Command: **Cn**    **Carrier Control**

Values:  $n = 1$

Default: 1

Description: C0 Transmit carrier always off. (Not supported.)  
 C1 Normal transmit carrier switching (included for backward compatibility with some software).

Command: **Ds**    **Dial**

Values:  $s =$  dial string (phone number and dial modifiers)

Default: none

Description: Dial telephone number  $s$ , where  $s$  may up to 40 characters long and include the 0–9, \*, #, A, B, C, and D characters, and the **L**, **P**, **T**, **V**, **W**, **S**, comma (,), semicolon (;), !, @, ^ and \$ dial string modifiers.

*Dial string modifiers:*

**L** Redial last number. (Must be placed immediately after **ATD**.)

**P** Pulse-dial following numbers in command.

**T** Tone-dial following numbers in command (default).

**V** Switch to speakerphone mode and dial the following number. Use **ATH** command to hang up.

**W** Wait for a new dial tone before continuing to dial. (**X2**, **X4**, **X5**, **X6**, or **X7** must be selected.)

, Pause during dialing for time set in register S8.

; Return to command mode after dialing. (Place at end of dial string.)

! Hook flash. Causes the modem to go on-hook for one-half second, then off-hook again.

@ Wait for quiet answer. Causes modem to wait for a ringback, then 5 seconds of silence, before processing next part of command. If silence is not detected, the modem returns a NO

ANSWER code.

^ Disable data calling tone transmission.

\$ Detect AT&T call card “bong” tone. The character should follow the phone number and precede the user’s call card number: **ATDT1028807637853500\$123456789**

Command: **DS=y** **Dial Stored Telephone Number**

Values:  $n = 0-1$

Default: none

Description: Dial a number previously stored in directory number *y* by the **&Zy=x** command.

Example: **ATDS=1**

Command: **En** **Echo Command Mode Characters**

Values:  $n = 0$  or  $1$

Default:  $1$

Description: E0 Do not echo keyboard input to the terminal.

E1 Do echo keyboard input to the terminal.

Command: **Fn** **Echo Online Data Characters**

Values:  $n = 1$

Default:  $1$

Description: F0 Enable online data character echo. (Not supported.)

F1 Disable online data character echo (included for backward compatibility with some software).

Command: **Hn** **Hook Control**

Values:  $n = 0$  or  $1$

Default:  $0$

Description: H0 Go on-hook (hang up).

H1 Go off-hook (make the phone line busy).

Command: **In** **Information Request**

Values:  $n = 0-5, 9, 11$

Default: None

Description: I0 Display default speed and controller firmware version.

I1 Calculate and display ROM checksum (e.g., *12AB*).

I2 Check ROM and verify the checksum, displaying *OK* or *ERROR*.

I3 Display default speed and controller firmware version.

I4 Display firmware version for data pump (e.g., *94*).

I5 Display the board ID: software version, hardware version, and country ID

I9 Display the country code (e.g., *NA Ver. 1*).

I11 Display diagnostic information for the last modem connection, such as DSP and firmware version, link type, line speed, serial speed, type of error correction/data compression, number of past retrains, etc.

Command: **Mn** **Monitor Speaker Mode**

Values:  $n = 0, 1, 2,$  or  $3$

Default:  $1$

Description: M0 Speaker always off.

M1 Speaker on until carrier signal detected.

M2 Speaker always on when modem is off-hook.

M3 Speaker on until carrier is detected, except while dialing.

**Command:  $Nn$  Modulation Handshake**Values:  $n = 0$  or  $1$ Default:  $1$ Description:  $N0$  Modem performs handshake only at communication standard specified by **S37** and the **B** command. $N1$  Modem begins handshake at communication standard specified by **S37** and the **B** command. During handshake, fallback to a lower speed can occur.**Command:  $On$  Return Online to Data Mode**Values:  $0, 1, 3$ 

Default: None

Description:  $O0$  Exit online command mode and return to data mode (see **+++AT<CR>** escape sequence ). $O1$  Issue a retrain and return to online data mode. $O3$  Issue a rate renegotiation and return to data mode.**Command:  $P$  Pulse Dialing**Values:  $P, T$ Default:  $T$ Description: Configures the modem for pulse (non-touch-tone) dialing. Dialed digits are pulsed until a **T** command or dial modifier is received.**Command:  $Qn$  Result Codes Enable/Disable**Values:  $n = 0$  or  $1$ Default:  $0$ Description:  $Q0$  Enable result codes. $Q1$  Disable result codes. $Q2$  Returns an *OK* for backward compatibility with some software.**Command:  $Sr=n$  Set Register Value**Values:  $r =$  S-register number;  $n$  varies

Default: None

Description: Set value of register  $Sr$  to value of  $n$ , where  $n$  is entered in decimal format. E.g., **S0=1**.**Command:  $Sr?$  Read Register Value**Values:  $r =$  S-register number

Default: None

Description: Read value of register  $Sr$  and display it in 3-digit decimal form. E.g., **S2?** gives the response *043*.**Command:  $T$  Tone Dialing**Values:  $P, T$ Default:  $T$ Description: Configures the modem for DTMF (touch-tone) dialing. Dialed digits are tone dialed until a **P** command or dial modifier is received.**Command:  $Vn$  Result Code Format**Values:  $n = 0$  or  $1$ Default:  $1$ Description:  $V0$  Displays result codes as digits (terse response). $V1$  Displays result codes as words (verbose response).

**Command: *Wn* Result Code Options**Values: *n* = 0, 1, or 2

Default: 2

Description: W0 CONNECT result code reports serial port speed, disables protocol result codes.  
W1 CONNECT result code reports serial port speed, enables protocol result codes.  
W2 CONNECT result code reports line speed, enables protocol result codes.

**Command: *Xn* Result Code Selection**Values: *n* = 0–7

Default: 4

Description: X0 Basic result codes (*e.g.*, *CONNECT*); does not look for dial tone or busy signal.  
X1 Extended result codes (*e.g.*, *CONNECT 46000 V42bis*); does not look for dial tone or busy signal.  
X2 Extended result codes with *NO DIALTONE*; does not look for busy signal.  
X3 Extended result codes with *BUSY*; does not look for dial tone.  
X4 Extended result codes with *NO DIALTONE* and *BUSY*.  
X5 Extended result codes with *NO DIALTONE* and *BUSY*.  
X6 Extended result codes with *NO DIALTONE* and *BUSY*.  
X7 Basic result codes with *NO DIALTONE* and *BUSY*.

**Command: *Yn* Long Space Disconnect**Values: *n* = 0

Default: 0

Description: Y0 Disable sending or responding to long space break signal on disconnect.  
Y1 Enable sending or responding to long space break signal on disconnect. (Not supported.)

**Command: *Zn* Modem Reset**Values: *n* = 0 or 1

Default: None

Description: Z0 Reset modem to profile saved by the last **&W** command.  
Z1 Same as **Z0**.

**Command: **&B***n* V.32 Auto Retrain**Values: *n* = 1

Default: 1

Description: &B0 Disable V.32 auto retrain. (Not supported.)  
&B1 Enable V.32 auto retrain.

**Command: **&C***n* Data Carrier Detect (DCD) Control**Values: *n* = 0 or 1

Default: 1

Description: &C0 Forces the DCD circuit to be always high.  
&C1 DCD goes high when the remote modem's carrier signal is detected, and goes low when the carrier signal is not detected.  
&C2 DCD drops briefly following disconnect, then goes high again. Register S18 defines how long DCD signal remains low after disconnect.

---

**Command: &En XON/XOFF Pacing Control**Values:  $n = 12$  or  $13$ Default:  $12$ 

Description: &amp;E12 Disables XON/XOFF pacing.

&amp;E13 Enables XON/XOFF pacing. (&amp;K4 must also be set)

**Note:** &E13 has no effect if hardware control (&K3) is selected.**Caution:** Do not enable pacing unless you need it. Some applications may not work if pacing is enabled.**Command: &Fn Load Factory Settings**Values:  $n = 0$ 

Default: None

Description: &amp;F0 Load factory settings as active configuration.

**Note:** See also the **Z** command.**Command: &Gn V.22bis Guard Tone Control**Values:  $n = 0, 1,$  or  $2$ Default:  $0$ 

Description: &amp;G0 Disable guard tone.

&amp;G1 Set guard tone to 550 Hz.

&amp;G2 Set guard tone to 1800 Hz.

**Note:** The **&G** command is not used in North America.**Command: &Kn Flow Control Selection**Values:  $n = 0, 3,$  or  $4$ Defaults:  $3$ 

Description: &amp;K0 Disable flow control.

&amp;K3 Enable CTS/RTS hardware flow control.

&amp;K4 Enable XON/XOFF software flow control.

**Command: &Qn Asynchronous Communications Mode**Values:  $n = 0, 5, 6, 8,$  or  $9$ Default:  $5$ Description: &Q0 Asynchronous with data buffering. Same as **IN0**.&Q5 Error control with data buffering. Same as **IN3**.&Q6 Asynchronous with data buffering. Same as **IN0**.&Q8 MNP error control mode. If MNP error control is not established, the modem falls back according to the setting in **S36**.&Q9 V.42 or MNP error control mode. If neither error control is established, the modem falls back according to the setting in **S36**.**Command: &Sn Data Set Ready (DSR) Control**Values:  $n = 0$  or  $1$ Default:  $0$ 

Description: &amp;S0 Force DSR always high (on).

&amp;S1 Let DSR go high only during a connection.

Command: **&Tn V.54 Test Commands**

Values:  $n = 0, 1, 3$  or  $6$

Default: None

Description: &T0 Abort. Stop any test in progress.

&T1 Local analog loopback test.

&T3 Local digital loopback test.

&T6 Remote digital loopback test.

**Note:** To stop a test, you must use the escape sequence (**+++AT**) before typing **AT&T0**.

Command: **&V Display Current Settings**

Values: n/a

Description: Displays the active modem settings, including the callback security settings if callback security is enabled. If the setup password has been entered, it also displays the callback security passwords.

Command: **&Wn Store Current Configuration**

Values:  $n = 0$

Default: None

Description: &W0 Stores current modem settings in nonvolatile memory and causes them to be loaded at power-on or following the **ATZ** command instead of the factory defaults. See also the **&F** command.

&W1 Clears user default settings from nonvolatile memory and causes the factory defaults to be loaded at power-on or following the **ATZ** command.

Command: **&Yn Select Stored Configuration for Hard Reset**

Values:  $n = 0$

Default: 0

Description: &Y0 Select stored configuration 0 on power-up. (For backward compatibility with some software.)

&Y1 Not supported—responds *ERROR*.

Command: **&Zy=x Store Dialing Command**

Values:  $y = 0-1$

$x$  = Dialing command

Default: None

Description: Stores dialing command  $x$  in memory location  $y$ . Dial the stored number using the command **ATDS=y**.

Command: **\An Select Maximum MNP Block Size**

Values:  $n = 0, 1, 2$ , or  $3$

Default: 3

Description: \A0 64-character maximum.

\A1 128-character maximum.

\A2 192-character maximum.

\A3 256-character maximum.

Command: **\Bn Transmit Break**

Values:  $n = 0-9$  in 100 ms units

Default: 3

Description: In non-error-correction mode only, sends a break signal of the specified length to a remote modem. Works in conjunction with the **\K** command.

---

**Command: \Gn Modem Port Flow Control**Values:  $n = 0$ 

Default: 0

Description: \G0 Returns an *OK* for backward compatibility with some software.  
\G1 Not supported—responds *ERROR*.**Command: \Jn Data Buffer Control**Values:  $n = 0$ 

Default: 0

Description: \J0 Enable data buffer—serial port speed is independent of connect speed.  
\J1 Disable data buffer—serial port speed is forced to the line speed.**Command: \Kn Break Control**Values:  $n = 0-5$ 

Default: 5

Description: Controls the response of the modem to a break received from the computer, the remote modem, or the **IB** command. The response is different for each of three different states.**Data mode.** The modem receives the break from the computer:

- \K0 Enter online command mode, no break sent to the remote modem.
- \K1 Clear data buffers and send break to the remote modem.
- \K2 Same as **\K0**.
- \K3 Send break immediately to the remote modem .
- \K4 Same as **\K0**.
- \K5 Send break to the remote modem in sequence with the transmitted data.

**Data mode.** The modem receives the break from the remote modem:

- \K0 Clear data buffers and send break to the computer.
- \K1 Same as **\K0**.
- \K2 Send break immediately to the computer.
- \K3 Same as **\K2**.
- \K4 Send break to the computer in sequence with the received data.
- \K5 Same as **\K4**.

**Online command mode.** The modem receives a **IBn** command from the computer:

- \K0 Clear data buffers and send break to the remote modem.
- \K1 Same as **\K0**.
- \K2 Send break immediately to the remote modem.
- \K3 Same as **\K2**.
- \K4 Send break to the remote modem in sequence with the transmitted data.
- \K5 Same as **\K4**.

**Command: \Nn Error Correction Mode Selection**Values:  $n = 0-5$ , or 7

Default: 3

Description: \N0 Non-error correction mode with data buffering (buffer mode; same as **&Q6**).  
\N1 Direct mode.  
\N2 MNP reliable mode. If the modem cannot make an MNP connection, it disconnects.  
\N3 V.42/MNP auto-reliable mode. The modem attempts first to connect in V.42 error correction mode, then in MNP mode, and finally in non-error-correction (buffer) mode with continued operation.  
\N4 V.42 reliable mode. If the modem cannot make a V.42 connection, it disconnects.  
\N5 V.42, MNP, or non-error correction (same as **\N3**).  
\N7 V.42, MNP, or non-error correction (same as **\N3**).

**Command: \Qn Flow Control Selection**Values:  $n = 0, 1, \text{ or } 3$ 

Default: 3

Description: \Q0 Disable flow control (same as **&K0**).  
\Q1 XON/XOFF software flow control (same as **&K4**).  
\Q2 CTS-only flow control. Not supported.  
\Q3 RTS/CTS hardware flow control (same as **&K3**).

**Command: \Tn Inactivity Timer**Values:  $n = 0, 1\text{--}255$ 

Default: 0

Description: \Tn Sets the time (in minutes) after the last character is sent or received that the modem waits before disconnecting. A value of zero disables the timer. Applies only in buffer mode.

**Note:** You can also set the inactivity timer by changing the value of **S30**.

**Command: \Vn Protocol Result Code**Values:  $n = 0, 1, \text{ or } 2$ 

Default: 1

Description: \V0 Disable the appending of the protocol result code to the DCE speed.  
\V1 Enable the appending of the protocol result code to the DCE speed.  
\V2 Same as **\V1**.

**Command: \Xn XON/XOFF Pass-Through**Values:  $n = 0 \text{ or } 1$ 

Defaults: 0

Description: \X0 Modem responds to and discards XON/XOFF characters.  
\X1 Modem responds to and passes XON/XOFF characters.

**Command: -Cn Data Calling Tone**Values:  $n = 0 \text{ or } 1$ 

Defaults: 0

Description: -C0 Disable V.25 data calling tone to deny remote data/fax/voice discrimination.  
-C1 Enable V.25 data calling tone to allow remote data/fax/voice discrimination.

**Command: %A Adaptive Answer Result Code Enable**Values:  $n = 0 \text{ or } 1$ 

Defaults: 0

Description: The %A command controls whether the *DATA* and *FAX* result codes will be sent by the modem. The modem must be in fax mode for this command to work. Also, the modem must be set to **+FAA=1** which enables the modem to distinguish between a fax and a data call. When these commands are enabled, the modem sends *DATA* to the computer when it detects data tones and *FAX* when it detects fax tones. These strings are used by some servers to select the appropriate communication program.

%A0 Disables adaptive answer result codes.

%A1 Enables adaptive answer result codes.

**Command: %B View Numbers in Blacklist**

Values: n/a

Description: If blacklisting is in effect, **AT%B** displays the numbers for which the last call attempted in the previous two hours failed. In countries that do not require blacklisting, the *ERROR* result code appears.



**Command: %Cn Data Compression Control**Values:  $n = 0$  or  $1$ Default:  $1$ Description: %C0 Disable V.42bis/MNP 5 data compression.  
              %C1 Enable V.42bis/MNP 5 data compression.**Command: %En Fallback and Fall Forward Control**Values:  $n = 0, 1$ , or  $2$ Default:  $2$ Description: %E0 Disable fallback and fall forward.  
              %E1 Enable fallback, disable fall forward.  
              %E2 Enable fallback and fall forward.**Command: #Sx Enter Setup Password**Values:  $x$ = password (1–8 characters, case sensitive)

Default: MTSMODEM

Description: Enters the remote configuration setup password.

**Command: #S=x Store Setup Password**Values:  $x$ = password (1–8 characters, case sensitive)

Default: MTSMODEM

Description: Stores a new remote configuration setup password.

**Command: +++AT<CR> Escape Sequence**

Values: n/a

Description: Puts the modem in command mode (and optionally issues a command) while remaining online. Type +++AT and up to ten command characters, then press ENTER. Used mostly to issue the hang-up command: +++ATH&lt;CR&gt;.

**Command: %%%AT<CR>Remote Configuration Escape Sequence**

Values: n/a

Description: Initiates remote configuration mode while online with remote modem. The remote configuration escape character (%) is defined in register **S13**.

## S-Registers

Certain modem values, or parameters, are stored in memory locations called S-registers. Use the **S** command to read or to alter the contents of S-registers (see previous section).

<u>Register</u>	<u>Unit</u>	<u>Range</u>	<u>Default</u>	<u>Description</u>
<b>S0</b>	1 ring	0, 1–255	1	Sets the number of rings until the modem answers. <b>ATS0=0</b> disables autoanswer completely.
<b>S1</b>	1 ring	0–255	0	Counts the rings that have occurred.
<b>S2</b>	decimal	0–127 128–255	43 (+)	Sets ASCII code for the escape sequence character. Values greater than 127 disable escape.
<b>S3</b>	decimal	0–127	13 (^M) character.	Sets the ASCII code for the carriage return character.
<b>S4</b>	decimal	0–127	10 (^J)	Sets the ASCII code for the line feed character.
<b>S5</b>	decimal	0–32 33–127	8 (^H)	Sets the ASCII code for the backspace character. Values greater than 32 disable backspace.
<b>S6</b>	seconds	2–65*	2*	Sets the time the modem waits after it goes off-hook before it begins to dial the telephone number.
<b>S7</b>	seconds	1–255*	50*	Sets the time the modem waits for a carrier signal before aborting a call. Also sets the wait for silence time for the @ dial modifier.
<b>S8</b>	seconds	0–65	2	Sets the length of a pause caused by a comma character in a dialing command.
<b>S9</b>	decimal	0, 1–127	37 (%)	Sets ASCII code for remote configuration escape character. <b>S9=0</b> disables remote configuration.
<b>S10</b>	100 ms	1–254	20	Sets how long a carrier signal must be lost before the modem disconnects.
<b>S11</b>	1 ms	50–150*	95*	Sets spacing and duration of dialing tones.
<b>S18</b>	1 ms	0–255	20	Sets duration of time from the time the carrier signal goes low and then goes high again as set up by the <b>&amp;C2</b> command.
<b>S28</b>	decimal	0, 1–255	1	0 disables, 1–255 enables V.34 modulation.
<b>S30</b>	1 minute	0, 1–255	0	Sets the length of time that the modem waits before disconnecting when no data is sent or received. A value of zero disables the timer. See also the <b>IT</b> command.
<b>S35</b>	decimal	0–1	0 d	0 disables, 1 enables the V.25 data calling tone, which allows remote data/fax/voice discrimination.
<b>S36</b>	decimal	0–7	7	Specifies the action to take in the event of a negotiation failure when error control is selected. (See <b>S48</b> .)

Register	Unit	Range	Default	Description																												
S37	decimal	0–19	0	<p>Sets the maximum V.34 “upstream” speed at which the modem attempts to connect.</p> <p>0 = maximum modem speed 1 = reserved 2 = 1200/75 bps 3 = 300 bps 4 = reserved 5 = 1200 bps 6 = 2400 bps 7 = 4800 bps 8 = 7200 bps 9 = 9600 bps 10 = 12000 bps 11 = 14400 bps 12 = 16800 bps 13 = 19200 bps 14 = 21600 bps 15 = 24000 bps 16 = 26400 bps 17 = 28800 bps 18 = 31200 bps 19 = 33600 bps</p>																												
S38	decimal	0–23	1	<p>Sets “downstream” data rate where K56flex provides rates of 32,000 to 56,000 in 2,000 bps increments, V.90 provides rates of 28,000 to 56,000 bps in increments of 1,333 bps.</p> <p>0 = V.90 disabled 1 = V.90 autorate</p> <table><tr><td><u>K56flex rates</u></td><td></td></tr><tr><td>2 = 32,000 bps</td><td>2 = 32,000 bps</td></tr><tr><td>3 = 34,000 bps</td><td>3 = 34,000 bps</td></tr><tr><td>4 = 36,000 bps</td><td>4 = 36,000 bps</td></tr><tr><td>5 = 38,000 bps</td><td>5 = 38,000 bps</td></tr><tr><td>6 = 40,000 bps</td><td>6 = 40,000 bps</td></tr><tr><td>7 = 42,000 bps</td><td>7 = 42,000 bps</td></tr><tr><td>8 = 44,000 bps</td><td>8 = 44,000 bps</td></tr><tr><td>9 = 46,000 bps</td><td>9 = 46,000 bps</td></tr><tr><td>10 = 48,000 bps</td><td>10 = 48,000 bps</td></tr><tr><td>11 = 50,000 bps</td><td>11 = 50,000 bps</td></tr><tr><td>12 = 52,000 bps</td><td>12 = 52,000 bps</td></tr><tr><td>13 = 54,000 bps</td><td>13 = 54,000 bps</td></tr><tr><td>14 = 56,000 bps</td><td>14 = 56,000 bps</td></tr></table> <p>15 = 45,333 bps 16 = 46,666 bps 17 = 48,000 bps 18 = 49,333 bps 19 = 50,666 bps 20 = 52,000 bps 21 = 53,333 bps 22 = 54,666 bps 23 = 56,000 bps</p> <p><b>Upstream data rates</b> The upstream V.90 data rate are 4800 to 33,600 bps in 2400 bps increments.</p>	<u>K56flex rates</u>		2 = 32,000 bps	2 = 32,000 bps	3 = 34,000 bps	3 = 34,000 bps	4 = 36,000 bps	4 = 36,000 bps	5 = 38,000 bps	5 = 38,000 bps	6 = 40,000 bps	6 = 40,000 bps	7 = 42,000 bps	7 = 42,000 bps	8 = 44,000 bps	8 = 44,000 bps	9 = 46,000 bps	9 = 46,000 bps	10 = 48,000 bps	10 = 48,000 bps	11 = 50,000 bps	11 = 50,000 bps	12 = 52,000 bps	12 = 52,000 bps	13 = 54,000 bps	13 = 54,000 bps	14 = 56,000 bps	14 = 56,000 bps
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<u>Register</u>	<u>Unit</u>	<u>Range</u>	<u>Default</u>	<u>Description</u>
<b>S42</b>	decimal	0–1	1	Enables/disables the 56K auto rate. When 56K auto is disabled, fallback to V.34 is also disabled. 0 = disable; 1 = enable.
<b>S43</b>	decimal	0–1	1	<i>For testing and debugging only.</i> Enables/disables V.32bis start-up auto mode operation. 0 = disable; 1 = enable.
<b>S48</b>	decimal	7 or 128	7	Enables (7) or disables (128) LAPM negotiation. The following table lists the <b>S36</b> and <b>S48</b> configuration settings for certain types of connections.

	S48=7	S48=128
S36=0, 2	LAPM or hangup	Do not use
S36=1, 3	LAPM or async	Async
S36=4, 6	LAPM, MNP, or hangup	MNP or hangup
S36=5, 7	LAPM, MNP, or aysnc	MNP or async

<b>S89</b>	seconds	0, 5–255	10	Sets the length of time in the off-line command mode before the modem goes into standby mode. A value of zero prevents standby mode; a value of 1–4 sets the value to 5.
<b>S109</b>	decimal	0–2	1	Sets one of three 56K operating modes: K56flex mode, V.90 mode, or Auto-mode. S109=2 forces V.90 connections for testing purposes, etc. S109 sets the 56K operating mode as shown below:  0 = V.90 disabled 1 = K56flex or V.90 (Dual mode enabled) 2 = V.90 only (K56flex disabled).

## Result Codes

In command mode your modem can send responses called *result codes* to your computer. Result codes are used by communications programs and can also appear on your monitor.

<u>Terse</u>	<u>Verbose</u>	<u>Description</u>
0	OK	Command executed
1	CONNECT	Modem connected to line
2	RING	Ring signal detected
3	NO CARRIER	Carrier signal lost or not detected
4	ERROR	Invalid command
5 *	CONNECT 1200	Connected at 1200 bps
6	NO DIALTONE	No dial tone detected
7	BUSY	Busy signal detected
8	NO ANSWER	No answer at remote end
10 *	CONNECT 2400	Connected at 2400 bps
11 *	CONNECT 4800	Connected at 4800 bps
12 *	CONNECT 9600	Connected at 9600 bps
13 *	CONNECT 14400	Connected at 14400 bps
14 *	CONNECT 19200	Connected at 19200 bps
24 *	CONNECT 7200	Connected at 7200 bps
25 *	CONNECT 12000	Connected at 12000 bps
26 *	CONNECT 16800	Connected at 16800 bps
40 *	CONNECT 300	Connected at 300 bps

55*	CONNECT 21600	Connected at 21600 bps
56*	CONNECT 24000	Connected at 24000 bps
57*	CONNECT 26400	Connected at 26400 bps
58*	CONNECT 28800	Connected at 28800 bps
59*	CONNECT 31200	Connected at 31200 bps
60*	CONNECT 33600	Connected at 33600 bps
70*	CONNECT 32000	Connected at 32000 bps, 56K rate
71*	CONNECT 34000	Connected at 34000 bps, 56K rate
72*	CONNECT 36000	Connected at 36000 bps, 56K rate
73*	CONNECT 38000	Connected at 38000 bps, 56K rate
74*	CONNECT 40000	Connected at 40000 bps, 56K rate
75*	CONNECT 42000	Connected at 42000 bps, 56K rate
76*	CONNECT 44000	Connected at 44000 bps, 56K rate
77*	CONNECT 46000	Connected at 46000 bps, 56K rate
78*	CONNECT 48000	Connected at 48000 bps, 56K rate
79*	CONNECT 50000	Connected at 50000 bps, 56K rate
80*	CONNECT 52000	Connected at 52000 bps, 56K rate
81*	CONNECT 54000	Connected at 54000 bps, 56K rate
82*	CONNECT 56000	Connected at 56000 bps, 56K rate
88	DELAYED	Delay is in effect for the dialed number
89	BLACKLISTED	Dialed number is blacklisted
90	BLACKLIST FULL	Blacklist is full
100	CONNECT 28000	Connected at 28000 bps, V.90 rate
101	CONNECT 29333	Connected at 29333 bps, V.90 rate
102	CONNECT 30666	Connected at 30666 bps, V.90 rate
103	CONNECT 33333	Connected at 33333 bps, V.90 rate
104	CONNECT 34666	Connected at 34666 bps, V.90 rate
105	CONNECT 37333	Connected at 37333 bps, V.90 rate
106	CONNECT 38666	Connected at 38666 bps, V.90 rate
107	CONNECT 41333	Connected at 41333 bps, V.90 rate
108	CONNECT 42666	Connected at 42666 bps, V.90 rate
109	CONNECT 45333	Connected at 45333 bps, V.90 rate
110	CONNECT 46666	Connected at 46666 bps, V.90 rate
111	CONNECT 49333	Connected at 49333 bps, V.90 rate
112	CONNECT 50666	Connected at 50666 bps, V.90 rate
113	CONNECT 53333	Connected at 53333 bps, V.90 rate
114	CONNECT 54666	Connected at 54666 bps, V.90 rate

\* *EC* is added to these result codes when the extended result codes configuration option is enabled. *EC* is replaced by one of the following codes, depending on the type of error control connection:

*V42bis* —V.42 error control (LAP-M) and V.42bis data compression

*V42* —V.42 error control (LAP-M) only

*MNP5* —MNP 4 error control and MNP 5 data compression

*MNP4* —MNP 4 error control only

*NoEC* —No error control protocol).





## Chapter 4 - Troubleshooting



## Introduction

Your modem was thoroughly tested at the factory before it was shipped. If you are unable to make a successful connection, or if you experience data loss or garbled characters during your connection, it is possible that the modem is defective. However, it is more likely that the source of your problem lies elsewhere. The following symptoms are typical of problems you might encounter:

- None of the LEDs light when the modem is on.
- The modem does not respond to commands.
- The modem dials but is unable to make a connection.
- The modem disconnects while online.
- The modem cannot connect when answering.
- The modem doesn't work with Caller ID.
- Fax and data software can't run at the same time.

If you experience problems, please check the following possibilities before calling Technical Support (see [Appendix D](#)).

### None of the Indicators Light

When you plug in the modem, the operating system detects and configures the modem, and the TR LED should come on.

If the TR LED does not come on, check to see that the software from the MT5634MU Installation CD has been installed (see Chapter 2, Step 2: Installing the Modem).

### The Modem Does Not Respond to Commands

- Make sure you are issuing the modem commands from the data communications software, either manually in terminal mode or automatically by configuring the software. (You cannot send commands to the modem from the DOS prompt.)
- Make sure you are in terminal mode in your data communications program, then type **AT** and press ENTER. If you get an *OK* response, your connections are good and the problem likely is in the connection setup in your communications software.
- Try resetting your modem by unplugging the USB cable from the modem, and then plugging it back in.
- Try rebooting the computer.
- The modem might be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem is possibly defective. Call Tech Support for assistance (see [Appendix D](#)).



## The Modem Dials But Cannot Connect

There can be several reasons the ZBA fails to make a connection. Possibilities include

- lack of a physical connection to the telephone line.
- incompatibility between modems.
- a busy signal.
- a wrong number.
- no modem at the other end.
- a faulty modem, computer, or software at the other end.

You can narrow the list of possibilities by using extended result codes. Extended result codes are enabled by default. If they have been disabled, enter **ATV1X4** and press ENTER while in terminal mode, or include **V1X4** in the modem's initialization string. When you dial again, the modem will report the call's progress.

- If the modem reports *NO DIALTONE*, check that the modem's telephone line cable is connected to both the modem's LINE jack (not the PHONE jack) and the telephone wall jack. If the cable looks secure, try replacing it. If that doesn't work, the problem might be in your building's telephone installation. To test the building installation, plug a telephone into your modem's telephone wall jack and listen for a dial tone. If you hear a dial tone, your modem might be installed behind a company phone system (PBX) with an internal dial tone that sounds different from the normal dial tone. In that case, the modem might not recognize the dial tone and might treat it as an error. Check your PBX manual to see if you can change the internal dial tone; if you can't, change your modem's initialization string to replace **X4** with **X3**, which will cause the modem to ignore dial tones (note, however, that **X3** is not allowed in some countries, such as France and Spain).
- If the modem reports *BUSY*, the other number might be busy, in which case you should try again later, or it might indicate that you have failed to add a **9**, prefix to the phone number if you must dial 9 for an outside line.

If you must dial 9 to get an outside line, the easiest way to dial it automatically is to include it in the modem's dial prefix, e.g., **ATDT9**,. Note the comma, which inserts a pause before the number is dialed. By inserting **9**, into the dial prefix, you do not have to include it in each directory entry.

To change the dial prefix in Windows 98 HyperTerminal, select **Call** from the **Call** menu, click **Dialing Properties**, and type **9** in the local and long distance boxes in **How I dial from this location**.

- If the modem reports *NO ANSWER*, the other system has failed to go off-hook, or you might have dialed a wrong number. Check the number.
- If the modem reports *NO CARRIER*, the phone was answered at the other end, but no connection was made. You might have dialed a wrong number, and a person answered instead of a computer, or you might have dialed the correct number but the other computer or software was turned off or faulty. Check the number and try again, or try calling another system to make sure your modem is working. Also, try calling the number on your telephone. If you hear harsh sounds, then another modem is answering the call, and the modems might be having problems negotiating because of modem incompatibilities or line noise. Try connecting at a lower speed.

## The Modem Disconnects While Online

- If you have Call Waiting on the same phone line as your modem, it can interrupt your connection when someone tries to call you. If you have Call Waiting, disable it before each call. In most telephone areas in North America, you can disable Call Waiting by preceding the telephone number with **\*70** (check with your local telephone company).

You can automatically disable Call Waiting by including the disabling code in the modem's dial prefix (e.g., **ATDT\*70**,—note the comma, which inserts a pause before the number is dialed). To change the dial prefix in Windows 98 HyperTerminal, select **Call** from the **Call** menu, click **Dialing Properties**, check **This location has Call Waiting**, and select the correct code for your phone service.

- If you have extension phones on the same line as your modem, you or someone else can interrupt the connection by picking up another phone. If this is a frequent problem, disconnect the extension phones before using the modem, or install another phone line especially for the modem.
- Check for loose connections between the modem and the computer and the telephone jack.
- You might have had a poor connection because of line conditions or the problem might have originated on the other end of the line. Try again.
- If you were online with an online service, it might have hung up on you because of lack of activity on your part or because you exceeded your time limit for the day. Try again.

## The Modem Cannot Connect When Answering

- Autoanswer might be disabled. Turn on autoanswer in your data communications program or send the command **ATS0=1** (**ATS0=2** if you have Caller ID service) to make sure your modem is in terminal mode.

## The Modem Doesn't Work with Caller ID

- Caller ID information is transmitted between the first and second rings, so if autoanswer is turned off (**S0=0**) or if the modem is set to answer after only one ring (**S0=1**), the modem will not receive Caller ID information. Check your initialization string, and if necessary change it to set the modem to answer after the second ring (**S0=2**).
- Make sure that you have Caller ID service from your telephone company.

## Fax and Data Software Can't Run at the Same Time

Communications devices can be accessed by only one application at a time. In Windows 98, you can have data and fax communication applications open at the same time, but they cannot use the same modem at the same time. Chapter 6 - Warranty, Service and Tech Support



## Appendices



## Appendix A: Regulatory Agency Compliance

### Class B Statement

#### FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### FCC Part 68 Telecom

1. This equipment complies with part 68 of the Federal Communications Commission Rules. On the outside surface of this equipment is a label that contains, among other information, the FCC registration number. This information must be provided to the telephone company.
2. As indicated below, the suitable jack (Universal Service Order Code connecting arrangement) for this equipment is shown. If applicable, the facility interface codes (FIC) and service order codes (SOC) are shown.
3. A FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant. See installation instructions for details.

4. The ringer equivalence number (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the device not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company.
5. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
6. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications in order to maintain uninterrupted service.
7. If trouble is experienced with this equipment (the model of which is indicated below) please contact MultiTech Systems, Inc. at the address shown below for details of how to have repairs made. If the equipment is causing harm to the network, the telephone company may request you to remove the equipment from the network until the problem is resolved.
8. No repairs are to be made by you. Repairs are to be made only by MultiTech Systems or its licensees. Unauthorized repairs void registration and warranty.
9. This equipment should not be used on party lines or coin lines.
10. If so required, this equipment is hearing-aid compatible.

Manufacturer:	MultiTech Systems, Inc.
Trade Name:	MultiMobileUSB
Model Number:	MT5634MU
FCC Registration Number:	AU7USA-27400-M5-E
Ren:	0.2A
Modular Jack (USOC):	RJ11C or RJ11W (single line)
Service Center in USA:	MultiTech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 (763) 785-3500 Fax (763) 785-9874

## FAX Branding Statement

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains the following information:

- Date and time the message is sent
- Identification of the business or other entity, or other individual sending the message
- Telephone number of the sending machine or such business, other entity, or individual

This information is to appear in a margin at the top or bottom of each transmitted page or on the first page of the transmission. (Adding this information in the margin is referred to as *fax branding*.)

Since any number of Fax software packages can be used with this product, the user must refer to the

Fax software manual for setup details. Typically the Fax branding information must be entered via the configuration menu of the software.

## **Canadian Limitations Notice:**

### **RINGER EQUIVALENCE NUMBER**

**NOTICE:** The ringer equivalence number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the ringer equivalence numbers of all the devices does not exceed 5.

**NOTICE:** The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.



## **EMC, Safety and R&TTE Directive Compliance**

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility.

and

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits:

and

Council Directive 1999/5/EC of 9 March on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

## New Zealand Telecom Warning Notice

The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

***This device is equipped with pulse dialing, while the Telecom standard is DTMF tone dialing. There is no guarantee that Telecom lines will always continue to support pulse dialing.***

Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to 'bell tinkle' or noise and may also cause a false answer condition. Should such problems occur, the user should NOT contact the Telecom Faults Service.

The preferred method of dialing is to use DTMF tones, as this is faster than pulse (decadic) dialing and is readily available on almost all New Zealand telephone exchanges.

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**Warning Notice:** No '111' or other calls can be made from this device during a mains power failure.

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This equipment may not provide for the effective hand-over of a call to another device connected to the same line.

Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. In order to operate within the limits for compliance with Telecom's Specifications, the associated equipment shall be set to ensure that calls are answered between 3 and 30 seconds of receipt of ringing.

## International Modem Restrictions

Some dialing and answering defaults and restrictions may vary for international modems. Changing settings may cause a modem to become non-compliant with national telecom requirements in specific countries. Also note that some software packages may have features or lack restrictions that may cause the modem to become non-compliant.

## Appendix B - V.90 Support

### Introduction

V.90 is the ITU designation for what had formerly been called V.pcm. The ITU recommendation V.90 was determined at a meeting in Geneva ending February 6, 1998.

V.90 will replace K56flex and other proprietary solutions for PCM connections. Dual-mode client modem code will be important until all central-site digital modems are upgraded to V.90 and all interoperability problems have been resolved. Until that time, the Dual-mode client code will provide reliable connections in K56flex mode to the central-site modems currently deployed.

Your V.90 dual-mode (V.90/K56flex) modem now includes:

- New AT commands,
- New Result Codes in V.90 mode, and
- A-law/ $\mu$ -law selection and various changes to the AT command documentation.

### V.90 Troubleshooting

1. Check if the modem firmware is the latest. If not, download the latest from [www.multitech.com](http://www.multitech.com).
2. Try adding one or more comma (,) characters to the dialed number in the dialing string.
3. Try limiting the speed with the **S37** (sets the maximum upstream speed) and **S38** (sets the maximum “downstream speed) commands.
4. Perform basic modem/line troubleshooting (check the phone line for noise, try a different line, try another device on the same line, etc).



# Appendix C: Loopback Tests

## Introduction

Each time you turn on your modem, it performs an automatic self-test to ensure proper operation. Your modem also has three diagnostic tests: local analog loopback, remote digital loopback, and local digital loopback. These ITU-T V.54 loopback tests isolate telephone circuit and transmission problems.

In a loopback test, data from your computer loops through the circuits of your modem and/or a remote modem before it appears on your monitor. When the loop has been completed, the data on your PC's monitor should match the original data.

The local analog loopback test allows you to verify that the modem's transmitter and receiver circuits are functioning properly.

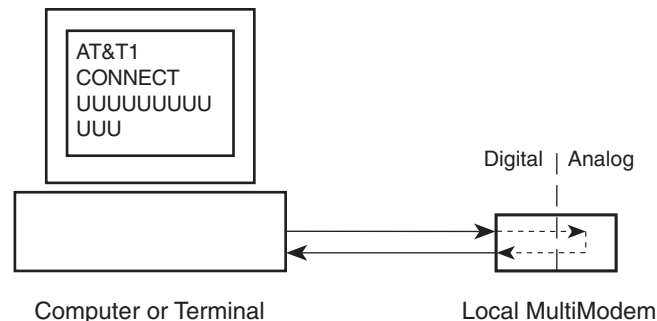
The local digital loopback allows you to verify that the local computer or terminal, the two modems, and the transmission line between them are functioning properly.

The remote digital loopback test allows you to verify that the remote computer or terminal, the remote modem, the serial ports, the telephone line, and the local modem are functioning properly.

**Note:** All loopback tests operate at all speeds except 300 bps.

## Local Analog Loopback Test (V.54 Loop 3)

In this test, data from your computer or terminal is sent to your modem's transmitter, converted into analog form, looped back to the modem's receiver, converted into digital form, and then sent to your monitor for verification. No connection to the phone line is required.



**Figure C-1. Local analog loopback test.**

## Test Procedure

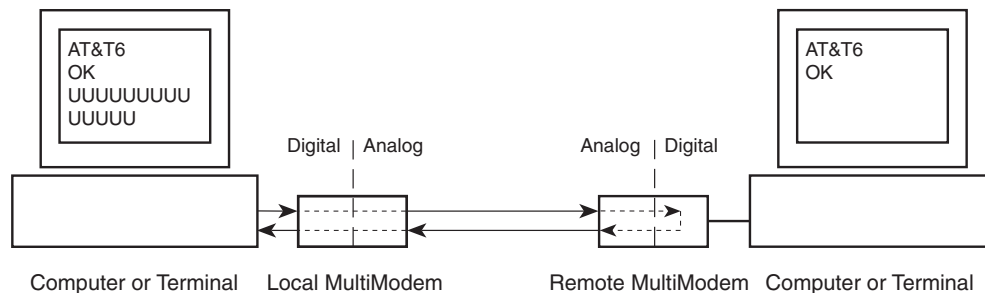
1. Connect the modem to your computer. Using your communication program, set the desired baud rate and go into terminal mode.
2. Type **AT&T1** and press ENTER. This places your modem in analog loopback mode in the originate mode. A *CONNECT* message should appear on your display. The modem is now out of command mode and in a pseudo-online mode.
3. Note that the CD LED is on. If you are set for 14,400 bps or higher, a speed LED should be on. If the CD LED is not on, there is a defect in your modem.
4. Enter characters from your keyboard. For this test, typing multiple uppercase *U* characters is a good way to send an alternating test pattern of binary ones and zeros. The characters entered should be displayed on your monitor. The TD and RD LEDs should flash when a

character is entered.

5. To exit the test, type the escape sequence **+++AT** and press ENTER. This puts the modem in online command mode. Then type either **AT&T** or **ATH** to return to command mode.
6. Your modem passes this test if the data received on your monitor are the same as the data entered from your keyboard. If different data appear on your monitor, your modem is probably causing the problem, though it could also be your computer. If your modem passes this test, but you are receiving errors while on line, the remote modem or the phone line could be at fault.

## Remote Digital Loopback Test (V.54 Loop 2)

The remote digital loopback test tests the phone lines and the circuits of both your modem and a remote modem. In this test, your modem must be on line with another modem that is set up to respond to a request for remote digital loopback. (Note that some modems might not support remote digital loopback or might have it disabled.) Data from your computer or terminal is transmitted through your modem and over the phone line to the remote modem, where it is then looped back to your modem.



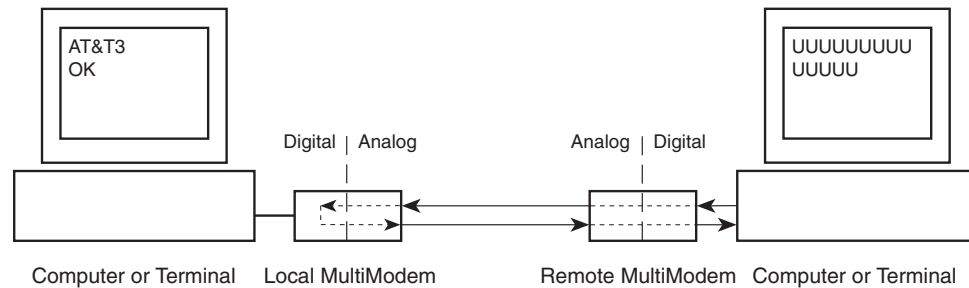
**Figure C-2. Remote digital loopback test.**

### Test Procedure

1. Arrange to have **&T6** set on the remote test modem.
2. Open your communications software and go into terminal mode. Type **AT** and press ENTER; you should get an **OK** message. Type **ATN** and press ENTER to disable error correction.
3. Dial the remote modem and establish your online connection.
4. Type the escape sequence **+++AT** and press ENTER to bring your modem into online command mode.
5. Type **AT&T6** and press ENTER. The local modem responds to this command by transmitting an unscrambled marking signal, which causes the remote modem to place itself in digital loopback mode. Then the local modem exits online command mode and enters data mode.
6. Enter data from your keyboard. For this test, typing multiple uppercase **U** characters is a good way to send an alternating test pattern of binary ones and zeroes. Data received by the remote modem enters its analog receiver, is converted to digital data, is reconverted into analog, and then is transmitted back to your modem. Your modem passes this test if the data received on your monitor is the same as the data entered from your keyboard.
7. To exit the test, type the escape sequence **+++AT** and press ENTER. This puts the modem in online command mode. The modem should respond with an **OK** message. If you wish to stay on line with the remote modem for normal data transmission, type **AT&T** and press ENTER to exit the test, then type **ATO** and press ENTER to return on line. If you wish to terminate the call, type **ATH** and press ENTER to hang up.

## Local Digital Loopback Test (V.54 Loop 2)

The local digital loopback test is identical to the remote digital loopback test with one exception. Instead of using your modem to signal a remote modem to place itself in digital loopback mode, your modem is placed in digital loopback mode while the remote modem is not. Data is entered and transmitted from the remote modem, sent across the phone line to your modem, and looped back to the remote modem.



**Figure C-3. Local digital loopback test**

### Test Procedure

1. Open your communications software and go into terminal mode. Type **AT** and press ENTER; you should get an *OK* message. Type **ATN** and press ENTER to disable error correction.
2. Dial the remote modem and establish your online connection.
3. Type the escape sequence **+++AT** and press ENTER to bring your modem into online command mode.
4. Type **AT&T3** and press ENTER. Once you receive an *OK* message from your modem (if responses are enabled), your modem is placed in digital loopback mode.
5. Have someone enter data from the remote keyboard. For this test, typing multiple uppercase *U* characters is a good way to send an alternating test pattern of binary ones and zeros. The data received by your modem enters its analog receiver, is converted to digital data, is reconverted into analog, and then is transmitted back to the remote modem. Your modem passes this test if the data received on the remote monitor is the same as the data entered from the remote keyboard.
6. To exit the test, type the escape sequence **+++AT** and press ENTER. This puts the modem in online command mode. The modem should respond with an *OK* message. If you wish to stay on line with the remote modem for normal data transmission, type **AT&T** and press ENTER to exit the test, then type **ATO** and press ENTER to return on line. If you wish to terminate the call, type **ATH** and press ENTER to hang up.

## Appendix D: Warranty, Service, and Technical Support

### Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter “MTS”) warrants that its product will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from the date of purchase, or, if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products that have been damaged by lightning storms, water, or power surges, or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products that prove to be defective within the warranty period, or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory -- transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

### Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

Multi-Tech Systems, Inc.  
2205 Woodale Drive  
Mounds View, MN 55112 U.S.A.  
Attn: Repairs, Serial # \_\_\_\_\_

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS to destinations in U.S. and Canada.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), and your telephone number. If the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. Bank.

For out of warranty repair charges, go to [www.multitech.com/COMPANY/Policies/warranty/](http://www.multitech.com/COMPANY/Policies/warranty/)

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS customer service at (888) 288-5470 or visit our web site at [www.multitech.com/PARTNERS/Programs/overnight\\_replacement/](http://www.multitech.com/PARTNERS/Programs/overnight_replacement/) for details on rates and coverages.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email [support@multitech.com](mailto:support@multitech.com). Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

## Repair Procedures for International Customers (Outside U.S.A. and Canada)

(Outside U.S.A. and Canada)

Your original point-of-purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product. The Multi-Tech sales office directory is available at [www.multitech.com/PARTNERS/Channels/offices/](http://www.multitech.com/PARTNERS/Channels/offices/)

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), and your telephone number. If the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. Bank. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email [support@multitech.com](mailto:support@multitech.com). When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

## Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repair of Multi-Tech product(s).

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

## Online Warranty Registration

If you have access to the World Wide Web, you can register your Multi-Tech product online at the following URL: <http://www.multitech.com/register>

## Technical Support Contacts

Country	By Email	By Phone
France:	<a href="mailto:support@multitech.fr">support@multitech.fr</a>	+(33) 1-64 61 09 81
Europe, Asia, Africa:	<a href="mailto:support@multitech.co.uk">support@multitech.co.uk</a>	+(44) 118 959 7774
U.S., Canada, all others:	<a href="mailto:support@multitech.com">support@multitech.com</a>	800-972-2439 or 763-717-5863

Please have modem information available.

## About the Internet

Multi-Tech's presence includes a Web site at: <http://www.multitech.com>  
and an ftp site at: <ftp://ftp.multitech.com>

## About Ordering Accessories

SupplyNet, Inc. supplies replacement transformers, cables and connectors for select Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at:

**Mail:** SupplyNet, Inc.  
614 Corporate Way  
Valley Cottage, NY 10989

**Phone:** 800 826-0279

**Fax:** 914 267-2420

**Email:** [info@thesupplynet.com](mailto:info@thesupplynet.com)

**Internet:** <http://www.thesupplynet.com>

### SupplyNet Online Ordering Instructions

1. Browse to <http://www.thesupplynet.com>. In the **Browse by Manufacturer** drop-down list, select **Multi-Tech** and click 
2. To order, type in quantity, and click 
3. Click  to change your order
4. After you have selected all of your items click  to finalize the order. The SupplyNet site uses Verisign's Secure Socket Layer (SSL) technology to ensure your complete shopping security.

## Software User License Agreement

SoftGSM software is licensed by Multi-Tech Systems, Inc. to the original end-user purchaser of the product, hereafter referred to as "Licensee." The License includes the distribution diskette, other accompanying programs, and the documentation.

The SoftGSM software, hereafter referred to as "Software," consists of the computer program files included on the original distribution diskette.

Licensee agrees that by purchase and/or use of the Software, he hereby accepts and agrees to the terms of this License Agreement. In consideration of mutual covenants contained herein, and other good and valuable considerations, the receipt and sufficiency of which is acknowledged, Multi-Tech Systems, Inc. does hereby grant to the Licensee a non-transferable and non-exclusive license to use the Software and accompanying documentation on the following conditions and terms:

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Licensee agrees to implement sufficient security measures to protect Multi-Tech Systems, Inc. proprietary interests and not to allow the use, copying or transfer by any means, other than in accordance with this agreement. Licensee agrees that any breach of this agreement will be damaging to Multi-Tech Systems, Inc.

Licensee agrees that all warranties, implied or otherwise, with regard to this Software, including all warranties of merchantability and fitness for any particular purpose are expressly waived, and no liability shall extend to any damages, including consequential damages, whether known to Multi-Tech Systems, Inc. It is hereby expressly agreed that Licensee's remedy is limited to replacement or refund of the license fee, at the option of Multi-Tech Systems, Inc., for defective distribution media. There is no warranty for misused materials.

This package contains 3.5-inch disks and/or CD-ROM discs. Neither this software nor the accompanying documentation may be modified or translated without the written permission of Multi-Tech Systems, Inc.

This agreement shall be governed by the laws of the State of Minnesota. The terms and conditions of this agreement shall prevail regardless of the terms of any other submitted by the Licensee. This agreement supersedes any proposal or prior agreement. Licensee further agrees that this License Agreement is the complete and exclusive statement of Agreement, oral, written, or any other communications between Multi-Tech Systems, Inc. and Licensee relating to the subject matter of this agreement. This agreement is not assignable without written permission of an authorized agent of Multi-Tech Systems, Inc.

## Appendix E: Dial-Up Networking

Microsoft's Dial-Up Networking (DUN) is a system component of Windows 95, 98, and 2000 that enables you to connect your computer to a variety of computer systems and networks, including the Internet.

Dial-Up Networking has been integrated into Windows 2000. If you are using Windows 95, 98, you may need to install the Dial-Up Networking code from the full-release Windows CD, a companion CD from your Original Equipment Manufacturer (OEM), or from a complete set of installation (\*.CAB) files on your hard drive. If you are connecting to the Internet, the TCP/IP protocol suite must also be installed on your computer.

If you are making a Dial-Up connection to the Internet, you'll need to set up an account with an Internet Service Provider (ISP). Your ISP should give you the following information:

- Your access account userid and password
- The access phone number(s) for dialing into your Internet Service Provider
- The protocol used to connect to your ISP (PPP or SLIP)
- Your ISP may or may not provide a *static* IP address for your computer. If your ISP provides an IP address for your computer or for their Domain Name Server (DNS), you'll need to enter these addresses when you configure the Dial-Up connection. Many ISPs use *dynamic* IP addresses which means they issue your computer a new IP address each time you log into their system. If your ISP uses dynamic IP addresses, you do not need to configure an IP address when you create your Dial-Up Connection.

The following instructions will guide you through setting up a basic Dial-Up Networking connection to the Internet. Many features and settings beyond those shown here are available for use when creating a Dial-Up connection.

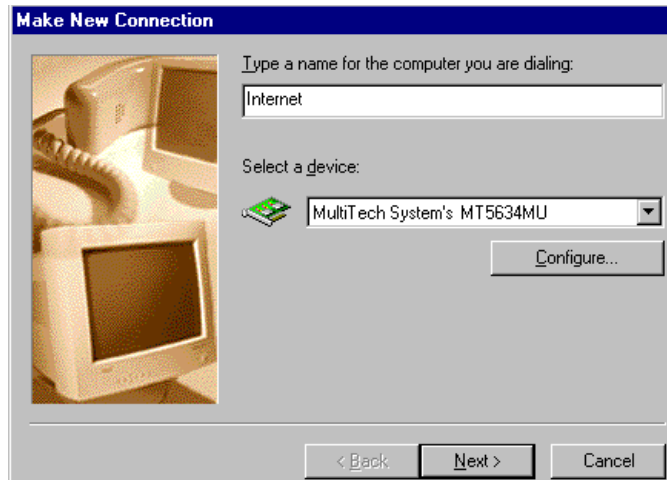
### Windows 95/98/ME Dial-Up Networking

**Note:** Before beginning, make certain Dial-Up Networking and TCP/IP are installed on your computer.

1. To begin your set up:
  - a. In Windows 95, go to **Start | Programs | Accessories | Dial-Up Networking**.
  - b. In Windows 98/ME, go to **Start | Programs | Accessories | Communications | Dial-Up Networking**.
2. If this is the first time you have set up a connection with Dial-Up Networking, the **Welcome to Dial-Up Networking Wizard** dialog box is displayed. If the Wizard does not display, double-click the **Make New Connection** icon to display the **Make New Connection** dialog box.



3. The **Make New Connection** dialog box is displayed. Enter a descriptive name for this connection. In the **Select a device:** list box, select your **Multi-Tech System** modem from the list.



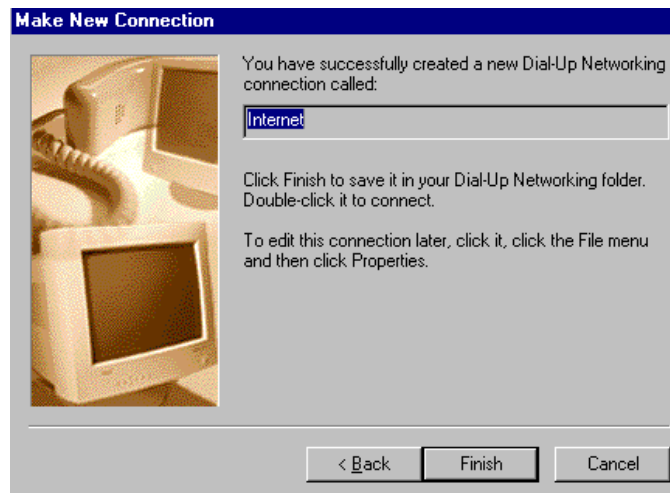
Click **Next>**.

4. The **Make New Connection** dialog box is displayed. Enter the Area Code, Telephone number and Country Code for the computer you will be calling with this connection (your ISP's access phone number).



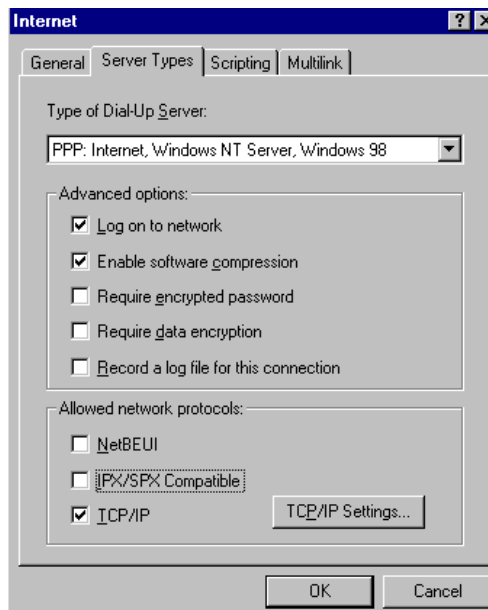
Click **Next>**.

5. The **Make New Connection** dialog box is displayed indicating you have successfully created a new Dial-Up connection.



Click **Finish**.

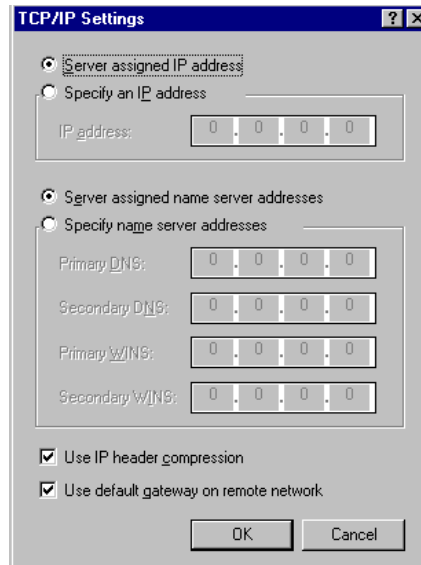
6. From the Dial-Up Networking folder, right click on the Dial-Up Connection just created and select **Properties** to open the **Modem Properties** dialog box.
7. The **Modem Properties** dialog box is displayed. For Windows 95/98, click the **Server Types** tab to display the server property screen. Select the appropriate Server Type, Log on options, and protocol selections for the device to which you are connecting (e.g., your ISP).  
*For Windows ME*, go to the **Networking** tab to choose these same server-related options.



Click **OK**.

8. If your ISP requires you to enter IP addresses for their server or DNS (Domain Name Server), click the **TCP/IP Settings** button. (In Win 95/98, the **TCP/IP Settings** button is on the **Server Types** screen; in Win ME, the **TCP/IP Settings** button is on the **Networking** screen.)

9. The **TCP/IP Settings** dialog box is displayed.



If your ISP provided you with an IP address for your computer, select **Specify an IP address** and enter the static address in the box provided. If your ISP requires you to enter an IP address for their name server (DNS), select **Specify name server addresses** and enter the IP addresses given to you by your ISP. Click **OK** to save the TCP/IP values and return to the **Server Types** tab.

When you have completed customizing the modem properties for this connection, click **OK**.

To use this connection, double-click the Dial-Up Connection icon within the Dial-Up Networking folder. If prompted, enter your Internet account User Name and Password and click **Connect**.

## Windows 2000 Dial-Up Networking

The following instructions describe all Dial-Up Networking connection options under Windows 2000 as well as guide you through setting up a Dial-up Networking connection to an Internet Service Provider (ISP).

**Note:** If you are connecting to the Internet, make sure TCP/IP is installed on your computer and that you've set up an access account with an Internet Service Provider.

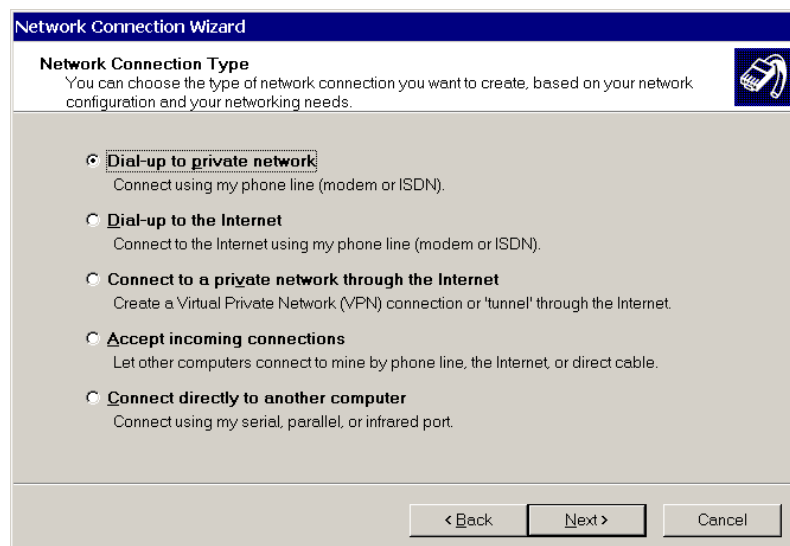
1. To set up a Dial-Up Networking connection within Windows 2000, select **Start | Settings | Network and Dial-up Connections**.

2. In the **Network and Dial-up Connections** dialog box, double-click the **Make New Connection** icon. The **Network Connection Wizard** dialog box is displayed indicating the Wizard will help in creating a connection to other computers and networks enabling applications such as e-mail, web browsing, file sharing and printing.



Click **Next>**.

3. The **Network Connection Type** dialog box is displayed offering several connection options. Select the option which best describes the type of connection you are creating with this definition.



Click **Next>**.

The process for completing your Dial-Up Networking connection will vary based on the connection type selected in the previous step.

If you select **Dial-up to private network** and have only one modem installed:

- a. The **Phone Number to Dial** dialog box is displayed. Enter the phone number of the computer, network or Internet Service Provider (ISP) to which you are connecting. Click **Next>**.
- b. The **Connection Availability** dialog box is displayed. If you are creating this connection for multiple users, select **Create this connection for all users**. If this connection will be used only by you, select **Create this connection only for myself**. Click **Next>** to continue.
- c. The **Completing the Network Connection Wizard** dialog box is displayed. You are prompted for a name to use for this connection. Enter a meaningful name in the box provided, then click **Finish**.

If you select **Dial-up to the Internet**, the **Welcome to the Internet Connection Wizard** is displayed as shown below.



- a. Select the appropriate option for the type of connection you are making to the Internet and click **Next>**. In this example, *"I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)"* has been selected.
- b. The **Setting up your Internet connection** dialog box is displayed. Select **I connect through a phone line and modem**. Click **Next>**.
- c. If you have only one modem installed, proceed to the next step. If you have more than one modem installed on your computer, select your **Multi-Tech System's** modem from the list and

click **Next>**.

- d. The **Step 1 of 3: Internet account connection information** dialog box is displayed. Enter the Area code, Telephone number and Country/region name and code for your Internet Service Provider's access number.
- e. Click the **Advanced** tab to access options for selecting your connection type and logon procedures. Your ISP should provide this information for your account. If you are not sure which connection type to choose, try PPP.

Although many ISPs automatically provide an IP address for your machine and their Domain Name Server (DNS) each time you connect to them, some ISPs do not. If your ISP provided IP addresses to you, click the **Addresses** tab. In the IP Address section, select **Always use the following:**, and enter the IP addresses into the appropriate boxes. Click **OK** to return to **Step 1 of 3: Internet account connection**, and click **Next>**.

**Note:** If your machine has a network adapter installed, do **not** enter this address in the address box. Enter the IP address provided by your ISP.

- f. The **Step 2 of 3: Internet account logon information** dialog box is displayed. Enter the user name and password you will use for your Internet account. Click **Next>**.
- g. The **Step 3 of 3: Configuring your computer** dialog box is displayed. In the box provided, enter a descriptive name for this connection and click **Next >**.
- h. You are then asked if you would like to set up an Internet mail account. You may select **Yes** or **No**. If you select yes, you will be asked to provide specific information about your mail service. In this example, **No** is selected. Click **Next>**.
- i. The **Completing the Internet Connection Wizard** is displayed. Click **Finish**.

*If you select **Connect to a private network through the Internet**:*

- a. In the box provided, enter the Host name or IP address belonging to the computer to which you are calling. Contact the network administrator for the device to which you are connecting to obtain this information. Click **Next>** to continue.
- b. The **Connection Availability** dialog box is displayed. If you are creating this connection for multiple users, select **Create this connection for all users**. If this connection will be used only by you, select **Create this connection only for myself**. Click **Next>** to continue.
- c. The **Completing the Network Connection Wizard** dialog box is displayed. You are prompted for a name to use for this connection. Enter a meaningful name in the box provided. Click **Finish**.

*If you select **Accept incoming connections**:*

This option allows another computer to create a virtual connection to your computer through the Internet, other public network or a direct cable. Virtual Private connections to your computer through the Internet are possible only if your computer has a known name or IP address on the Internet.

- a. The **Devices for Incoming Connections** dialog box is displayed. Select your **Multi-Tech System** modem and click **Next>**.
- b. At the **Incoming Virtual Private Connection** dialog box, select either **Allow virtual private connection** or **Do not allow virtual private connection**.
- c. The **Allowed Users** dialog box is displayed. Next, you can **Add** or **Delete** users you will allow to connect to this device. Click **Next>**.
- d. In the **Networking Components** dialog box, select the boxes next to the name of each networking component you want to enable for incoming connections. Click **Next>**.
- e. The **Completing the Network Connection Wizard** dialog box is displayed. In the box

provided, enter a meaningful name for this connection and click **Finish**.

*If you select **Connect directly to another computer**:*

This connection option is designed to allow a connection between two computers using a serial, parallel or infrared port.

- a. The **Host or Guest** dialog box is displayed. Select the role you'd like for *this* computer. Select **Host** if this computer has the information you want to access. Select **Guest** if this computer will be used to access information on the Host computer.
- b. If you select **Host**, you will be presented with the **Connection Device** dialog box. Select the device from the list. After installing the device through the Wizard, you may configure the connection properties by right clicking on the icon for this connection and selecting **Properties**. Upon completion, click **Next>**.

The **Allowed Users** dialog box is displayed. Select the check box next to the name of each user you want to allow to connect to this computer. Click **Next>**.

- c. If you select **Guest**, the **Select a Device** dialog box is displayed. Select the COM port you'd like to use for this connection from the list. Click **Next>**.
- d. The **Connection Availability** dialog box is displayed. If you are creating this connection for multiple users, select **Create this connection for all users**. If this connection will be used only by you, select **Create this connection only for myself**. Click **Next>** to continue.
- e. The **Competing the Network Connection Wizard** dialog box is displayed. You are prompted for a name to use for this connection. Enter a meaningful name in the field provided and click **Finish**.

## Appendix F: Upgrading the Modem

### Introduction

Your modem is controlled by semi-permanent software, called *firmware*, which is stored in flash memory. Firmware is nonvolatile; that is, it remains stored in memory when the modem is turned off. However, it can be changed by either the manufacturer or the user as bugs are fixed or new features are added.

Since the firmware in your modem is stored in flash memory, you can upgrade it yourself in a few minutes by using the following procedures and Multi-Tech's Flash Wizard program.

### Upgrade Overview

The upgrade procedure consists of the following steps, which are described in greater detail in the following sections.

1. Identify the model number and firmware version of your modem.
2. Identify the current version of the firmware at the Multi-Tech Web site. If your modem already has the current firmware, there is no need to update it.
3. Download the upgrade file for your modem.
4. Extract the firmware .HEX file and the appropriate flash upgrade program from the file you downloaded.
5. Document and clear your stored parameters.
6. Upgrade the modem's firmware using the .HEX file and the flash upgrade program.
7. Restore your parameters.

#### ***Step 1: Identify the Modem Firmware***

You must know the model number and firmware version of your Multi-Tech modem to know whether or not you should update it.

1. Run your favorite terminal program. You can use HyperTerminal for Windows 95, 98, ME, 2000 or Windows NT.
2. In the program's terminal window, type **AT&F**. Even if you cannot see the **AT&F** command on your screen, be sure to type it completely, and then press ENTER. If the modem does not respond with **OK**, repeat the **AT&F** command.
3. Now type **ATI3** and record your results. The firmware version should appear first in the response, which should look **similar** to the following:

```
V2.300G-V90_2M_DLS
```

#### ***Step 2: Identify the Current Firmware Version***

Identify the current version of the firmware at the Multi-Tech Web site. If your modem already has the current firmware, there is no need to update it.

1. Using your favorite Web browser, go to <http://www.multitech.com/support/MultiMobileUSB/firmware.asp>.
2. Scroll down the table to your modem model number.
3. Look at the firmware version number for your modem.
4. If the firmware version number matches the number found in "Step 1: Identify the Modem Firmware," your modem has the current firmware version, and does not need to be updated.



5. If the firmware version number is greater than the firmware version number found in “Step 1: Identify the Modem Firmware,” your modem has an older firmware version. Continue with “Step 3: Download the Upgrade File.”

---

**Warning:** The first digit of the new firmware must match the first digit of the old firmware, or the modem may not work properly; e.g., if your current firmware version is 4.16, replace it only with 4.xx firmware, not 6.xx firmware.

---

### ***Step 3: Download the Upgrade File***

1. If you are not already at the MultiMobileUSB firmware page of the Multi-Tech Web site, follow the procedure in “Step 2: Identify the Current Firmware.”
2. Download the upgrade file for your modem by clicking its name, and save the file in a temporary folder on your hard disk.
3. In the same section of the Web page, download the Flash Wizard utility for your operating system by clicking it, and save it in the same folder.

### ***Step 4: Extract the Upgrade Files***

1. Install the Flash Wizard utility by double-clicking the file name in Windows Explorer.
2. Extract the upgrade files by double-clicking the file name. The extracted files include a .HEX file, which contains the upgrade data, and a Readme file.
3. Copy the upgrade .HEX file into the Flash Wizard folder, which, in a default installation, is at C:\Program Files\MultiTech Systems\Flash Wizard\.

### ***Step 5: Clear Your Stored Parameters***

Before you flash your modem, you should record the parameters that are currently stored in it, so you can reprogram it after flashing. After you have recorded them, send the **AT&F** command to the the modem to clear the stored parameters.

1. Run your favorite terminal program. If you are using Windows 95, 98, 2000, or Windows NT, you can use HyperTerminal.
2. In the program’s terminal window, type **AT&V** and press ENTER to list your modem’s current parameters.
3. Record your parameters by saving the screens and sending them to your printer.
4. Type **AT&F** and press ENTER to clear your stored parameters and reset your modem to factory default.
5. Close the terminal program.

### ***Step 6: Upgrade the Modem’s Firmware***

Before you begin the following procedure, read the README.TXT file extracted from the upgrade archive file. Note the file name for the new firmware (e.g., BkQg300G.hex).

---

**Warning:** Never install an older version of firmware over a newer version. Doing so will destroy the Flash PROM! If the Flash PROM is destroyed, the modem must be sent in for repair.

---

1. Run Flash Wizard by double-clicking its icon or file name, or by selecting it from the Start menu. The **Identifying Devices** dialog box is displayed as Flash Wizard locates and identifies the devices connected to your system.

---

**Note:** If the message *ERROR: No valid devices detected* is displayed, verify that the device is powered on and that all cables are correctly and securely attached.

---

2. Click the modem to be upgraded, and then click **Next** to proceed.
3. Select the port to be upgraded from the **Port** list, select the appropriate .HEX file from the **Hex File** list, and then click **Next** to continue.

---

**Note:** Do not use FLASHLDR.HEX. This file is used internally by Flash Wizard.

---

4. The **Progress** dialog box appears, showing a status bar that indicates the progress of the upgrade.

---

**Caution:** Any disruption of the program during this stage of the upgrade can cause your modem to become inoperable. Wait for the **Next** button to become active before proceeding.

---

8. When the flash upgrade is complete, the message *Programming Complete* appears. Click **Next** to continue.
9. The **Results** dialog box appears next. Click **Finish** to exit Flash Wizard.

### ***Step 7: Restore Your Parameters***

Your modem has been updated. You can now open your terminal program to reprogram your modem parameters or to confirm the update by typing **ATI3** in the terminal window and pressing **ENTER**.

## Appendix G - Multi-Tech Systems Modem Scripts for Mac OS

This document discusses the various MultiTech Systems modem scripts available for the Mac OS and where they should be put in order to use them.

### Models Supported By These Scripts

MTA128ST-USB, MTA128ST-USB-RC (Some models are identified with MTA128ST-USB-RC where the RC indicates there is no support for V.110 via hardware and so the V.110 scripts will not work. The AT12 command will indicate the model name).

The above models will be referred to from here on as MTA128ST-USB.

### Script Names and Descriptions

#### MTS MTA128ST-USB V.110 1200

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 1200 (S76=2). The default serial baud rate is 1200.

#### MTS MTA128ST-USB V.110 2400

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 2400 (S76=3). The default serial baud rate is 2400.

#### MTS MTA128ST-USB V.110 4800

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 4800 (S76=4). The default serial baud rate is 4800.

#### MTS MTA128ST-USB V.110 9600

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 9600 (S76=5). The default serial baud rate is 9600.

#### MTS MTA128ST-USB V.110 19200

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 19200 (S76=6). The default serial baud rate is 19200.

#### MTS MTA128ST-USB V.110 38400

Sets up the MTA128ST-USB in V.110 mode (&F1), disables command echoing (E0), ignores DTR (&D0), disables auto-answer (S0=0), sets V.110 network rate control to use the \$MB/S76 speed (S77=2), and sets the V.110 network rate to 38400 (S76=7). The default serial baud rate is 38400.

#### MTS MTA128ST-USB V.120

Sets up the MTA128ST-USB in V.120 mode (&F2), disables command echoing (E0), ignores DTR (&D0), and disables auto-answer (S0=0). The default serial baud rate is 230400.

#### MTS MTA128ST-USB X.75

Sets up the MTA128ST-USB in X.75 mode (&F3), disables command echoing (E0), ignores DTR (&D0), and disables auto-answer (S0=0). The default serial baud rate is 230400.

#### MTS MTA128ST-USB PPP

Sets up the MTA128ST-USB in PPP mode (&F4 &J0), disables command echoing (E0), ignores DTR (&D0), and disables auto-answer (S0=0). In order to do Multi-Link PPP with this modem script, you must dial two phone numbers separated by the ampersand symbol (&). For example, 5551000 sets up a single channel PPP connection and 5551000&5553000 sets up the MTA128ST for a Multi-Link PPP data session. The default serial baud rate is 230400.

#### MTS MTA128ST-USB ML-PPP

Sets up the MTA128ST-USB in ML-PPP mode (&F4 &J1), disables Dynamic Bandwidth Allocation (S59=0), disables command echoing (E0), ignores DTR (&D0), and disables auto-answer (S0=0). The default serial baud rate is 230400.

#### MTS MTA128ST-USB ML-PPP w/DBA

Sets up the MTA128ST-USB in ML-PPP mode (&F4 &J1), enables Dynamic Bandwidth Allocation (S59=1), disables command echoing (E0), ignores DTR (&D0), and disables auto-answer (S0=0). The default serial baud rate is 230400.

**MTS MTA128ST-USB Generic**

This modem script makes no changes to the parameters of the terminal adapter except to disable command echoing (E0) and disable auto-answer (S0=0). Use a terminal program such as Z-Term, Black Night, or C-Kermit

to make changes to parameters and then save the changes with &W0. When the script is run it will not set the terminal adapter to any factory default as most other scripts do, thus you can have a lot of control over the terminal adapter's abilities. The default serial baud rate is 230400.

**MTS MTA128ST-USB Auto Answer**

This modem script makes no changes to the parameters of the terminal adapter except to disable command echoing (E0), ignore DTR (&D0), enable auto-protocol detection (S52=1), and disable auto-answer (S0=0). This is similar to the Generic script except this script sets S52=1 (auto-protocol detection). Use this script for answering calls. The default serial baud rate is 230400.

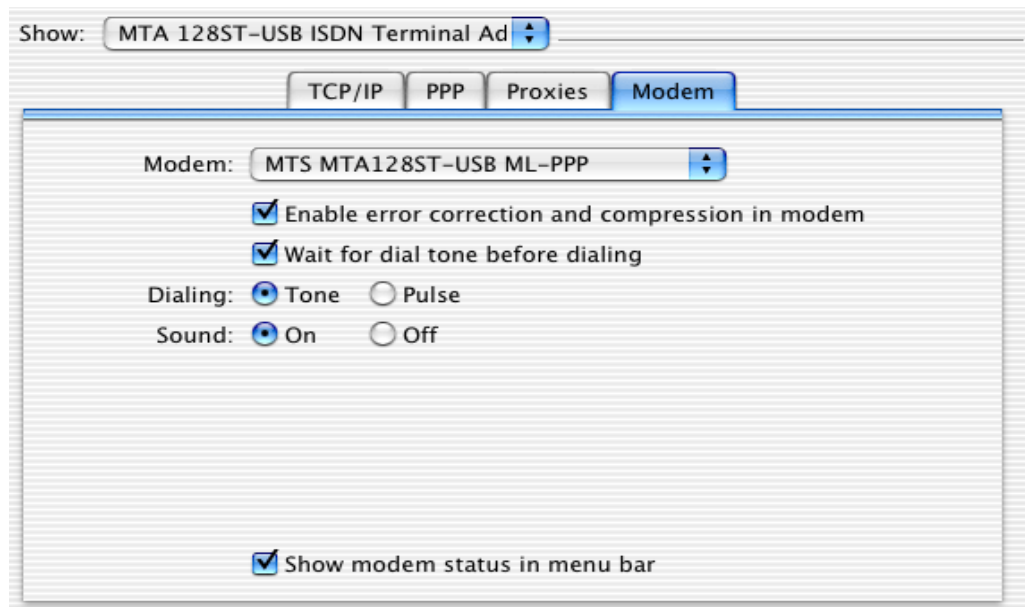
## Mac OS X Instructions

### Where to put the modem scripts (drag and drop installation)

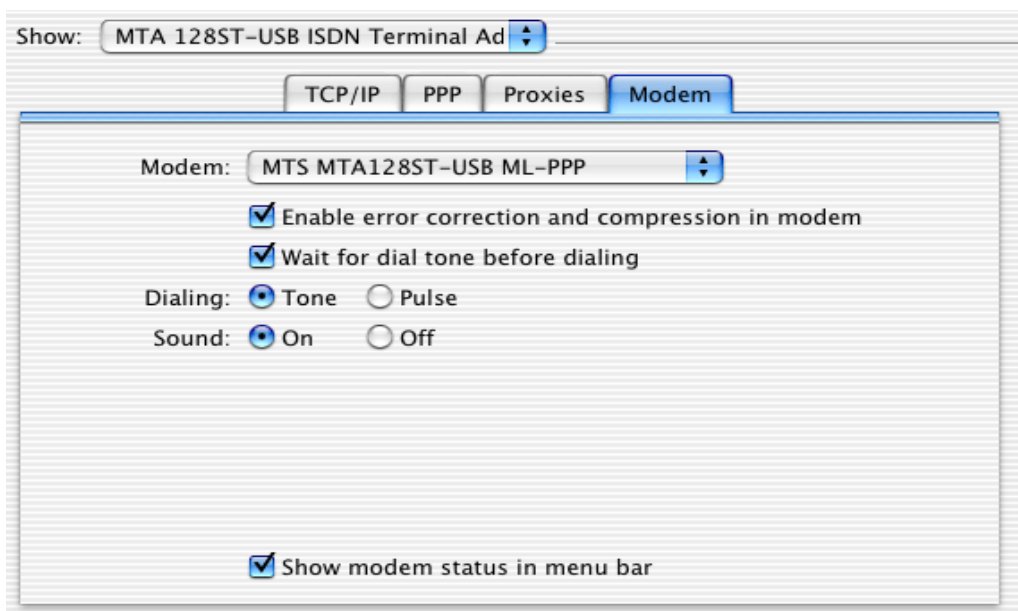
The desired modem scripts should be placed in the Modem Scripts folder. The path to the Modem Scripts folder in Mac OS X is as follows: "/Library/Modem Scripts" in the root of the Mac OS X installation partition or drive. You must be the administrator (or have administrator privileges) to be able to copy to the Modem Scripts folder. Make sure you quit the System Preferences application (don't just close the window) before installing the modem scripts, otherwise the "Modem:" pop-up list in the Modem tab of the Network pane will not show the new modem scripts. If the System Preferences application was open during installation of the modem scripts, then quit System Preferences and open it again.

### Using a Modem Script

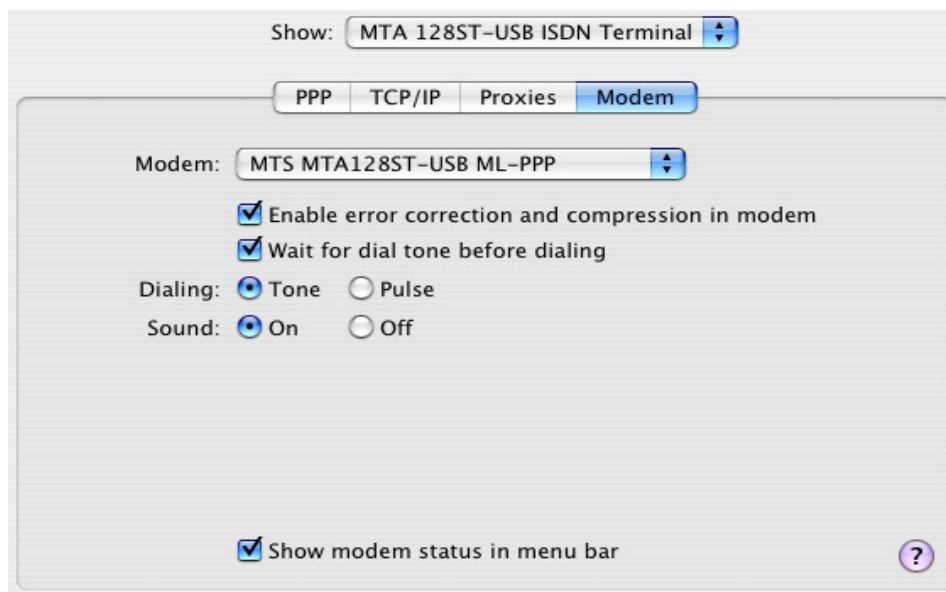
After the desired modem script has been installed, open System Preferences from the Apple menu and/or USB terminal adapters connected to the USB. Normally you could double-click select the Network pane. Make sure you have a dial-up device or port selected in the "Configure:" (Mac OS X 10.0) or "Show:" (Mac OS X 10.1 through 10.3) pop-up list and then select the Modem tab. Select the desired MultiTech modem script from the "Modem:" pop-up list. Finally, click on the "Save" (Mac OS X 10.0) or "Apply Now" (Mac OS X 10.1 through 10.3) button. You are now ready to use your MultiTech terminal adapter.



Mac OS x10.1 Network Pane



Mac OS X 10.2 Network



Mac OS X 10.3 Network Pane

## Step-by-Step Instructions

1. Quit System Preferences if it is active (don't just close the window).
2. Copy the desired MultiTech modem script(s) into "/Library/Modem Scripts" in the root of the Mac OS X partition or drive. You must be the administrator (or have administrator privileges) to be able to copy to the Modem Scripts folder.
3. Connect the MultiTech terminal adapter to the Macintosh and turn it on if it is not already connected and/or turned on. The MTA128ST-USB can be connected to the USB keyboard since it does not draw power from the USB.
4. Open System Preferences from the Apple menu and select the Network pane.
5. Installing a USB terminal adapter:
  - i. For Mac OS X 10.0:
    - a. Select the "Configure:" pop-up list and select Advanced.
    - b. Select the item called "USB ModemYYY" where YYY is a number like 062. This is the MultiTech USB terminal adapter assuming there are no other USB modems or USB terminal adapters connected to the USB. Normally you could double-click on this item and change its name to be more descriptive, but a bug in Mac OS X 10.0.x prevents proper renaming, so steps (c) through (d) will explain how to rename this item if you wish to rename it.
    - c. With "USB ModemYYY" selected, click on the Duplicate button, change the name of the item to a more descriptive name. For example, change the name to MTA128ST-USB if the USB device is a MultiTech MTA128ST-USB terminal adapter. After renaming the item click on OK.
    - d. You may select the "USB ModemYYY" item again and click on Delete... if you wish to remove that item from the list since you now have a duplicate of that device already made.
    - e. Make sure the USB terminal adapter check box is checked.
    - f. Now select the "Configure:" pop-up list and choose your USB terminal adapter (in this example, choose MTA128ST-USB).
  - ii. For Mac OS X 10.1 through 10.3:
    - a. When the Network pane window is activated, a window will pop up indicating



- that a new network port has been detected. Click on the "OK" button to continue.
- b. Select the "Show:" pop-up list and select "Active Network Ports" (Mac OS X 10.1) or "Network Port Configurations" (Mac OS X 10.2 and 10.3).
  - c. Select the item called "MTA 128ST Terminal Adapter". You may double-click on this item and change its name to be more descriptive. For example, change the name to MTA128ST-USB if the USB device is a MultiTech MTA128ST-USB terminal adapter.
  - d. Make sure the USB terminal adapter check box is checked (on).
  - e. You may also want to uncheck (turn off) some of the other network ports or at least change priorities. For example, if you wish to use the MTA128ST-USB terminal adapter rather than Apple's internal modem, then uncheck the "Modem Port" and/or "Internal Modem" checkbox. Now click and hold on the MTA128ST-USB

- network port and drag it to the top of the list so that a dark bar appears above all of the other network ports. Now release the mouse button and the MTA128ST-USB will be the primary network port when attempting a connection.
- f. Now select the “Show:” pop-up list and choose your USB terminal adapter (in this example, choose MTA128ST-USB).
6. With the desired USB terminal adapter selected in the “Configure:” (Mac OS X 10.0) or “Show:” (Mac OS X 10.1 through 10.3) pop-up list, you are ready to finish setting up the dial-up connection information:
- Set up the appropriate information in the TCP/IP tab.
  - Set up the appropriate information in the PPP tab.
  - Set up the appropriate information in the Proxies tab.
  - Select the Modem tab and select the desired MultiTech modem script from the “Modem:” pop-up list.
  - Click on the “Save” (Mac OS X 10.0) or “Apply Now” (Mac OS X 10.1 through 10.3) button.
7. You are now ready to use the Internet Connect application to test your dial-up connection.

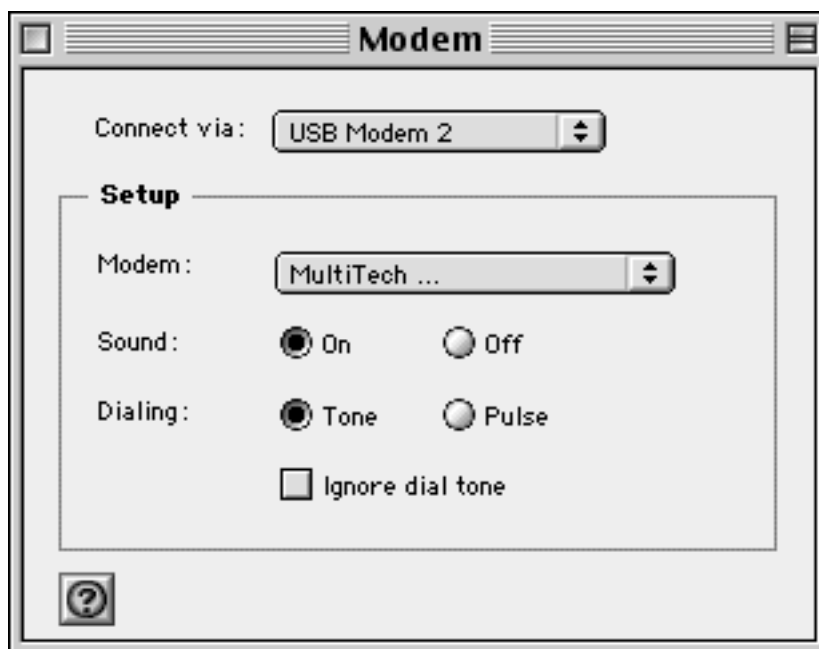
## Mac OS 9.2.2 and Older Instructions

### Where to put the modem scripts (drag and drop installation)

The desired modem scripts should be placed in the Modem Scripts folder. The path to the Modem Scripts folder in Mac OS 9.x is as follows: “System Folder:Extensions:Modem Scripts”. Make sure you close the Modem control panel before installing the modem scripts, otherwise the Modem control panel won’t see the new modem scripts until it is closed and opened again.

### Using a Modem Script

After the desired modem script has been installed, open the Modem control panel and select the desired MultiTech modem script for your use.



Mac OS 9.x Modem Control Panel

**Using System Extensions in Mac OS 8.5.1 and Mac OS 8.6**

The MTA128ST-USB does not support Mac OS 8.5.1 nor Mac OS 8.6. Mac OS 9 or newer is required.

**Setting the Correct Port (Connect via:)**

Select the appropriate terminal adapter in “Connect via:” of the Modem control panel. The “Connect via:” name will be “USB Modem “ and then a USB port number. For example, if the USB terminal adapter is plugged into USB port 2 of the computer, then the “Connect via:” name will be “USB Modem 2.” If there is a USB hub between the terminal adapter and the computer and the USB hub is plugged into USB port 2 of the computer and the terminal adapter is plugged into USB port 4 of the USB hub, then the “Connect via:” name will be “USB Modem 24.”



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